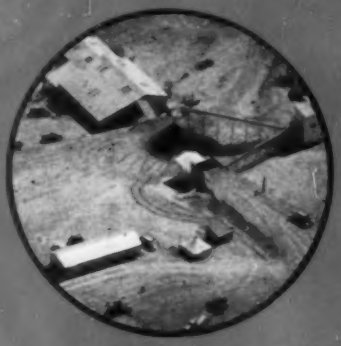
MINING WORLD



in this issue

Newest Montana Tungsten Mill

Page 38

"I CUT MY COSTS IN HALF" . . . by changing from chutes to drawholes for loading mine production. Many companies are changing to drawpoints and using their dependable Eimco muckers to load with many advantages.

Write for complete information on cutting your loading costs with Eimco loaders.

EIMCO

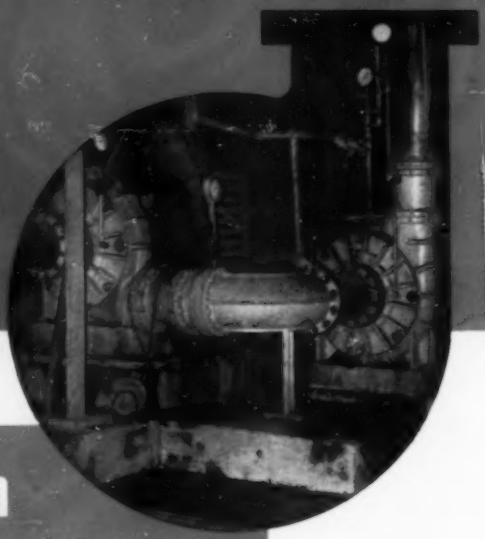
THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

JANUARY 1955

VOL. 17 No. 1

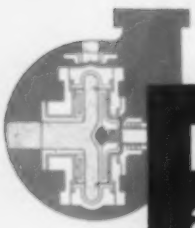
35 cents a copy
In sterling 2s

Why LONG-RANGE BUDGETING calls for Hydroseals



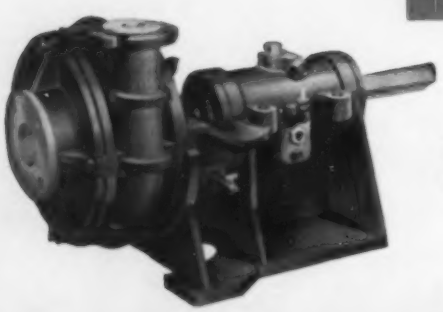
They maintain initial higher efficiency throughout longer life

1/3 to 1/2 saving in power costs



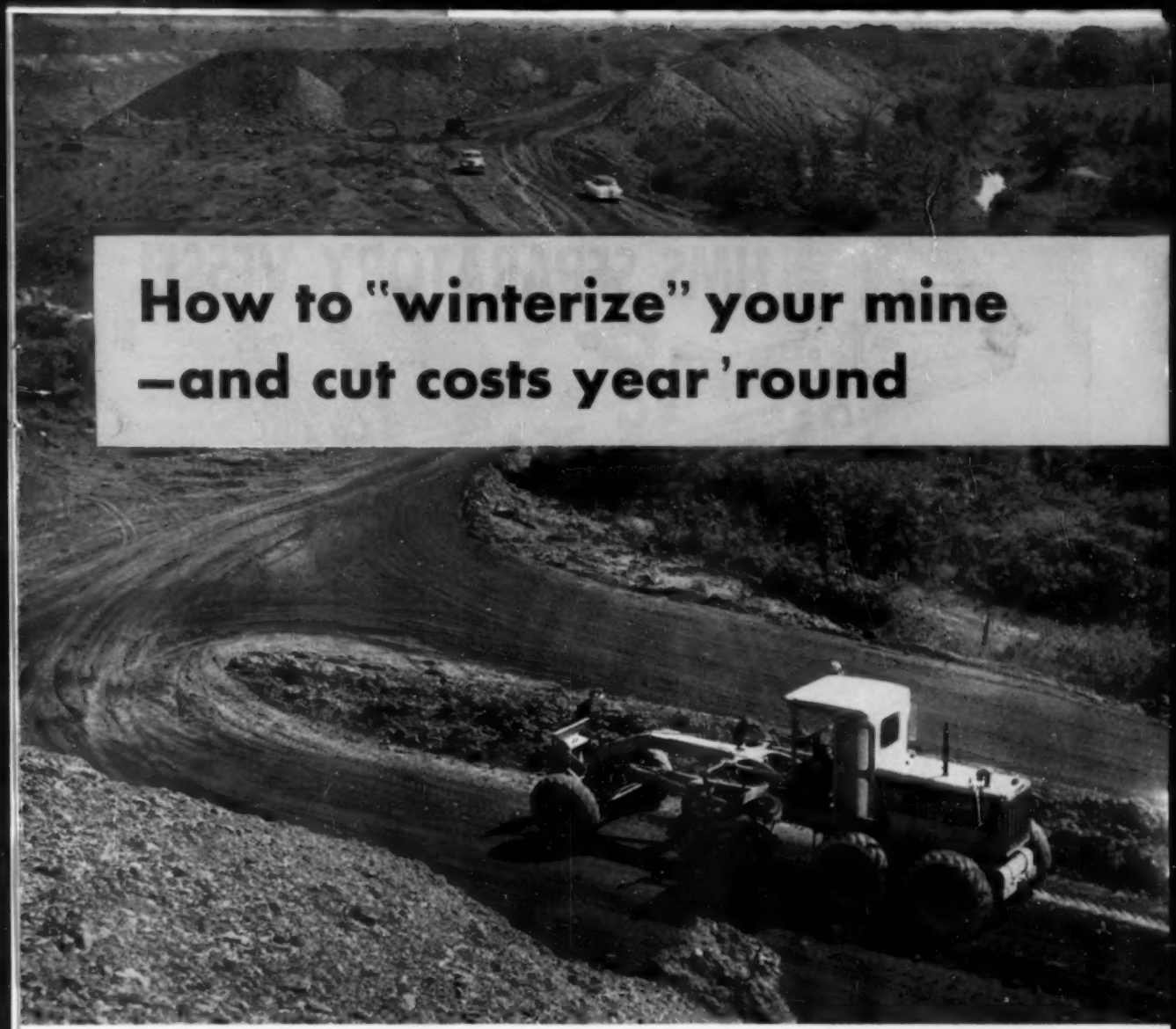
Flexible in application

Economical replacement of Maximix Rubber parts



Write for Hydroseal Catalog No. 953.

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives throughout the World



How to "winterize" your mine —and cut costs year 'round

RIGHT NOW is the time many veteran mining men are whipping haul roads into shape for fast, safe surfaces this winter. They find it pays off in stepped-up cycle times and reduced wear and tear on costly equipment.

The Caterpillar No. 12 Motor Grader can stay on the job through autumn rains and freezing winter conditions. The one shown here, a veteran of 9900 hours, maintains haul roads for Evans Coal Company's strip mine four miles north of Bokoshe, Okla. In addition, the grader cuts drainage ditches and cleans off the top of a 24-foot vein of coal.

The No. 12 can also blade and do light bulldozing. With a scarifier it can loosen hard material. With the Domor elevating attachment it can load overburden. And in winter, with a V-plow or Domor snow blower in place of the regular blade, it can keep haul roads open.

There's practically no end to this machine's utility around a mine. To do all these jobs well takes a *truly balanced grader*. Only Caterpillar has carefully-engineered balance between power, weight and working speed, because only CAT* Motor Graders are built entirely by a single manufacturer. The Caterpillar Diesel Engine develops full power on inexpensive No. 2 furnace oil *without fouling*.

Of all Caterpillar Motor Graders ever built, 99% are still in use. Take a look at their husky construction and you'll see why. Your Caterpillar Dealer will gladly arrange an inspection of the Cat No. 12 for you, and will *prove* on the job that this machine can help increase *your* profits. Call him now—and count on him whenever you need fast, skilled service and genuine Caterpillar parts.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill., U.S.A.

CATERPILLAR*

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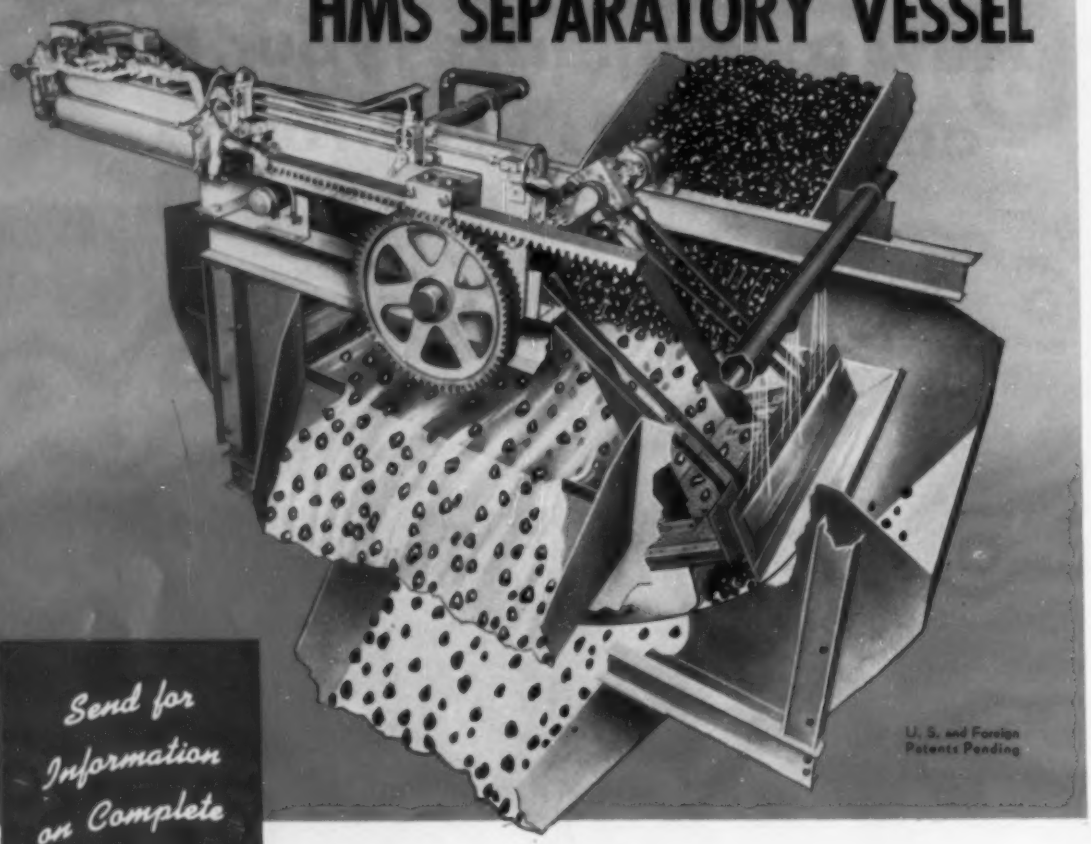
Announcing A **New** TYPE HMS SEPARATORY VESSEL



Send for Information on Complete Pilot Plant Demonstration and Testing Services

OCC

'OCC' VESSEL INTRODUCES UNPRECEDENTED SIMPLICITY

The new OCC vessel represents the successful realization of the main advantage of the HMS process:—its utter simplicity. The simplicity and efficiency of the OCC vessel are shown by these 6 noteworthy features:—

- **High separating efficiency.**
- **Low operating, maintenance costs.**
- **No rotating parts in the medium.**
- **Open vessel; separation visible.**
- **Quiet pool; no adverse turbulence.**
- **Quickly adjustable rake speed.**

Complete HMS testing, plant designing and installation services.

THE ORE & CHEMICAL CORPORATION

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Mining World

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

Volume 17 **JANUARY 1955** No. 1

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Cover Circle: Aerial view of Minerals Engineering Company's tungsten flotation mill near Glenn, Montana. In less than three years Minerals has made the Browns Lake open pit one of largest domestic tungsten producers. The 400 ton flotation mill shown on cover was built and placed in operation in 100 days to treat Browns Lake ore. It is now being enlarged to 700 tons per day capacity.

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MILLER FREEMAN PUBLICATIONS

GRAB SAMPLES From the Mail

Interested In Bluewater

Dear Sir:

In the August 1954 issue of MINING WORLD there is an article describing the operation of the Bluewater mill of the Anaconda Copper Mining Company. This is evidently the first of a series of articles.

If it is possible, we should like to have a reprint of the August article and of any subsequent articles which may appear.

CATALYTIC CONSTRUCTION COMPANY
1528 Walnut Street
Philadelphia, Pennsylvania

Handy Uranium Reference

Dear Sir:

The article appearing in the August 1954 issue of MINING WORLD entitled "Milling Uranium Ores: How Anaconda Does The Job At Its Bluewater Plant," is very well written and is considered a handy reference article on this subject.

If you have some extra reprints available for distribution, we would appreciate receiving about a dozen copies.

THOMAS B. UPCHURCH
Acting Assistant Director
Director of Raw Materials
United States Atomic
Energy Commission

Keep Up The Good Work

Dear Sir:

We feel we simply must express our appreciation of, and thank you for, your fine articles in the August and September issues of MINING WORLD on Anaconda's uranium milling and mining operations at Grants, New Mexico.

It is more than that we are interested in uranium—your articles are more like the fine, interesting, and valuable articles we used to get in the mining publications long ago. Keep up the good work.

LEACH & LEACH
Rare and Precious Metal Mines
Lordsburg, New Mexico

Reads For Technical Knowledge

Dear Sir:

At the present time I have the pleasure of informing you of a change in address to this company where I have taken the position as administrator of mining and exploration.

My first subscription to MINING WORLD was started when I worked for the Companhia de Diamantes de Angola where I worked for about 20 years as mill foreman and in other technical positions in diamond mining operations.

In May I resigned that position to come here and take my present job.

Undoubtedly I am indebted to you for all my knowledge of technical matters without which it would not have been possible for me to be successful in Africa.

EUGENIO P. LAZARO
Venezolana del Diamante, S.A.
Gran Sabana, Venezuela

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DORRCO

ON January first of this year, Dorr-Oliver Incorporated became a corporate entity through the merger of The Dorr Company, Engineers and Oliver United Filters Incorporated. Not a merger in name only, the combined staffs, engineering skills and facilities of the two organizations are being welded into a single unit, with a vastly increased capacity to serve on a worldwide basis.

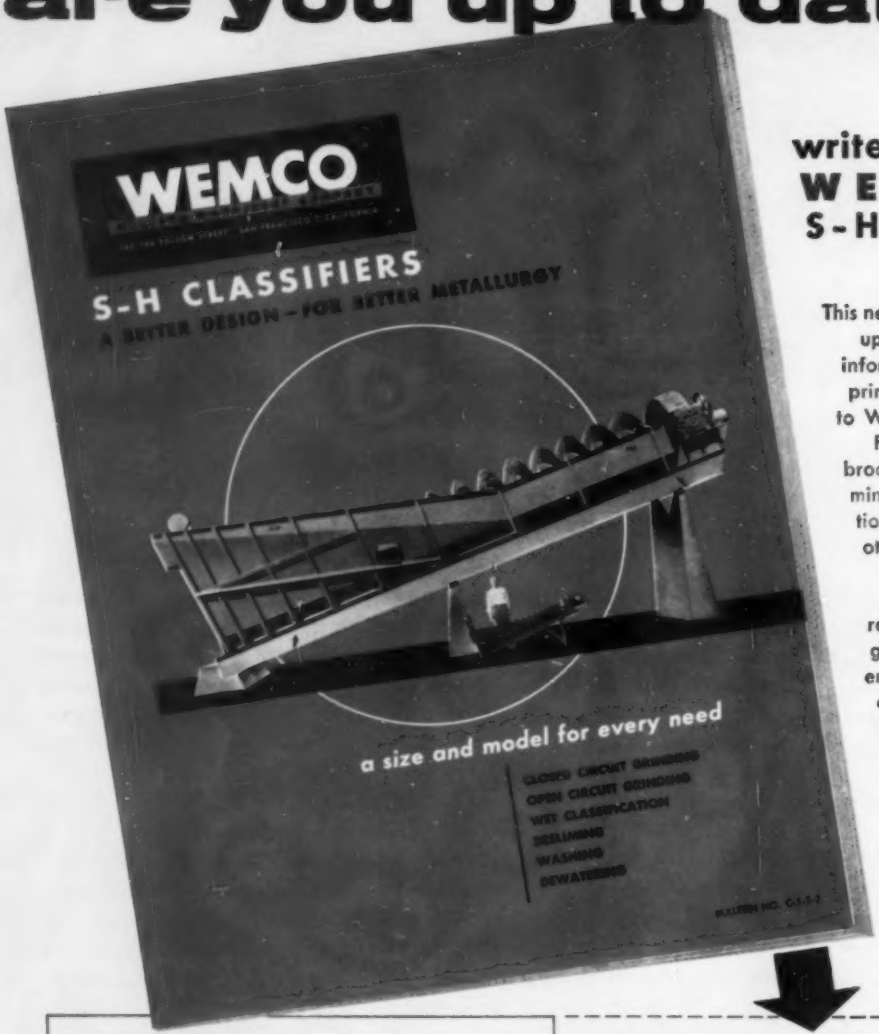
Both companies have their roots in gold ore metallurgy. The Dorr Company was founded by John Van Nostrand Dorr on his early inventions, the first of which was developed in 1904 to solve the problem of mechanical classification of gold ores. Oliver United had its beginning in 1907 with the development of the first successful continuous vacuum filter by Edwin Letts Oliver and its practical application to the cyanide process. Since their inception, both companies have grown steadily in technical stature to positions of leadership in their ever-widening and complementary, fields.

This cumulative, combined experience . . . coupled with a progressive faith in the future . . . is the strength of Dorr-Oliver. For present and future clients alike throughout the world it means better solutions to process problems in those fields of metallurgical, chemical, industrial and sanitational engineering in which Dorr and Oliver have specialized for nearly half a century.

DORR-OLIVER
INCORPORATED
STAMFORD, CONNECTICUT, U.S.A.

Edwin Letts Oliver, Founder and President of Oliver United Filters, at left and John Van Nostrand Dorr, Founder and Chairman of the Board of The Dorr Company, at right. The globe, long symbolic of worldwide operations, stands in the home office of the new corporation in Stamford, Connecticut.

are you up to date?



write for the new WEMCO S-H CLASSIFIER BULLETIN

This new bulletin contains valuable, up to date mineral engineering information on wet classification principles and their application to Wemco S-H Classifier design. Fully illustrated, this 20 page brochure is designed for use in mineral dressing, coal preparation, aggregate production and other related processing fields. It provides a store of useful information for ready reference by mine managers, general and mill superintendents, metallurgical and process engineers, design engineers, millmen, students and others.

SUBJECTS COVERED—*Here is a sample of some of the important subjects covered in this presentation:*

- WET CLASSIFICATION PRINCIPLES
- DESIGN PRINCIPLES
- METALLURGICAL PRINCIPLES
- CAPACITY TABLES
- BALANCED PERFORMANCE
- FIELD APPLICATIONS
- DESIGN SPECIFICATIONS
- OPERATING CONTROLS
- DIMENSIONAL DRAWINGS
- PROPER CHOICE OF MODELS
- SHIPPING WEIGHTS AND VOLUMES
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WRITE NOW—just fill in coupon for your free copy of this valuable bulletin. If you would like extra copies for your associates, simply tell us how many. No obligation, of course.

WESTERN MACHINERY COMPANY
760 Folsom Street Dept. B
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Gentlemen: Please send ____ copies of the new Wemco S-H Classifier Bulletin.

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Pace-Setting HD-5G Tractor Shovel

NOW BETTER 3 WAYS

From the time of its introduction seven years ago, the Allis-Chalmers HD-5G Tractor Shovel has been tops in popularity. Many thousands are daily proving their ability and versatility on all kinds of material handling and excavating jobs.

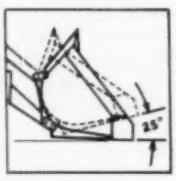
Now, design refinements make the HD-5G a three-way better value than ever before:

1. Has Bigger Rated Capacity

New bucket handles a big 1¼-yd load — streamlined design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more payload where it's wanted.

2. Helps the Operator Do More

Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.

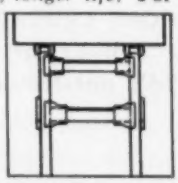


For added versatility, there is a two-position bucket available with both standard automatic return to digging position and operator-controlled tip-back. If the operator chooses to use the controlled tip-back, he can load the bucket, then tip it back approximately 25° before raising, assuring maximum output under special conditions such as downhill loading or loading loose materials.

The HD-5G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

3. Works at Lower Cost

The HD-5G now works at even lower cost than ever before — not just because it *does more*, but because it has features that mean *less maintenance, longer life.* For instance, new type tubular bracing on the bucket booms provides added strength and support, keeps the bucket in line. The floor at the rear of the new bucket has been raised seven degrees to reduce wear on the bottom sheet. Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.



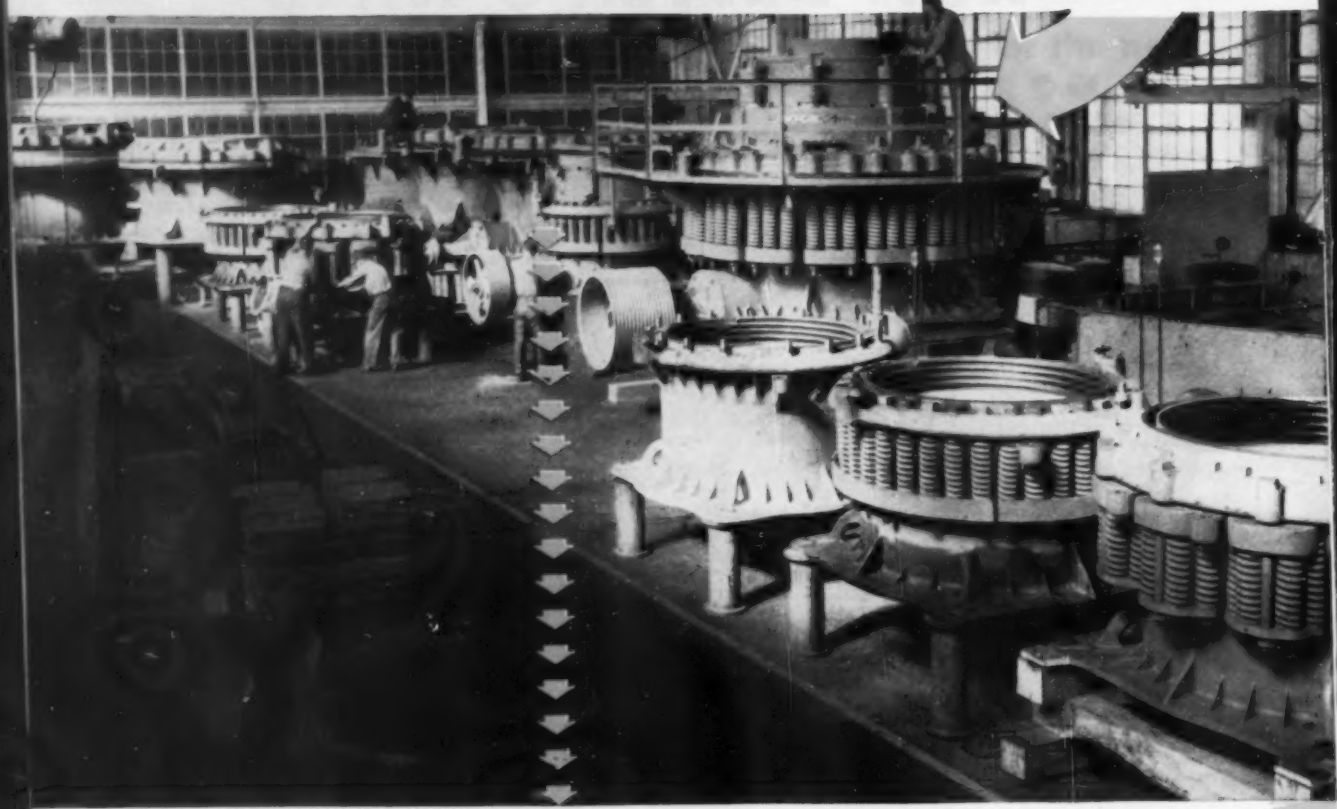
Ten Quick-Change Attachments Add to HD-5G Versatility

Bulldozer	Crane Hook	Tine Fork
Angledozer	Light Material Bucket	Rock Fork
Narrow Bucket	Trench Hoe	— also rear-mounted Ripper
Rock Bucket	Lift Fork	

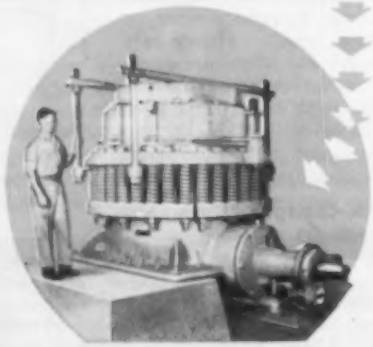
See your Allis-Chalmers dealer for more about these and other production-boosting features of the popular HD-5G Tractor Shovel.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Here's the 5000th SYMONS®



...and here is SYMONS CONE CRUSHER No. 5001... built for one of the world's outstanding Slag Producers



With the 5,000th SYMONS CONE CRUSHER completed, production on Number 5001 was well along . . . a 4' standard crusher scheduled for delivery to one of the world's largest slag producers—who have installed a total of 63 SYMONS CONE CRUSHERS for the dependable, profitable crushing of huge tonnages of slag.

This installation points up the important fact that a large proportion of all SYMONS CONES in service are repeat orders *from satisfied users. For example, here are just a few fields in which SYMONS CONES are used, and the number of repeat orders placed by* single *users in each field:*

ASBESTOS	18	IRON	32
ABRASIVES	16	LEAD-ZINC	24
CEMENT	6	MOLYBDENUM	18
COPPER	41	NICKEL	28
FELDSPAR	15	NITRATE	11
GOLD	8	REFRACTORIES	12
GRAVEL	18	STONE	39

SYMONS GYRATORY CRUSHERS

NORDBERG GRINDING MILLS

NORDBERG KILNS AND COOLERS

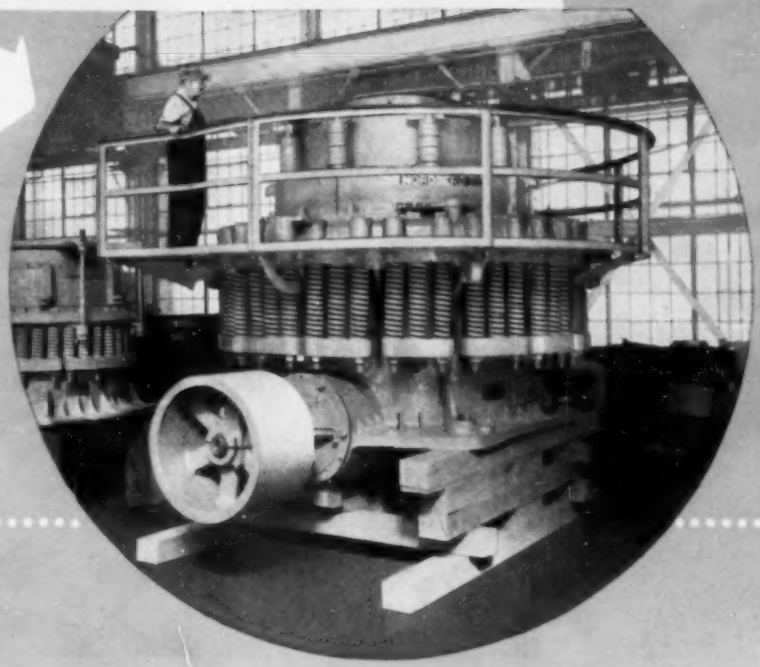
NORDBERG MINE HOISTS

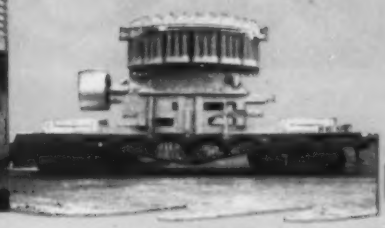
SYMONS VIBRATING GRIZZLIES AND SCREENS

NORDBERG DIESEL • DUAFUEL® and SPARK-IGNITION GAS ENGINES

CONE CRUSHER . . .

A RECORD MADE POSSIBLE THROUGH REPEAT ORDERS OF THE WORLD'S LEADING PRODUCERS OF ORES AND INDUSTRIAL MINERALS





No. 5000 . . . one of 37 Super Heavy 7-ft. SYMONS CONES destined for the Lake Superior Iron Ore Region to process TACONITE

● The introduction of the SYMONS CONE CRUSHER, little more than a quarter of a century ago, marked a new era in fine reduction crushing operations. No other type of crushing machinery ever received such enthusiastic acceptance . . . and today its world-wide use is unparalleled.

A typical example of this universal acceptance is the fact that this *5,000th* SYMONS CONE CRUSHER will soon be installed in the Lake Superior Region—one of 37 Super Heavy 7-ft. SYMONS CONES that have been given the difficult assignment of crushing the hard, tough Taconite Iron Ores.

For in Taconite . . . *as in all of the great ore and industrial mineral operations the world over* . . . there has been no record to equal the performance of SYMONS CONE CRUSHERS that have so consistently and efficiently produced great quantities of finely crushed product at low cost. *These, then, are the machines that have truly revolutionized modern crushing practice!*

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C654

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

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Milwaukee, Wisconsin

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Heat treating gives LIMAS greater strength and longer service life

In the 1500 degree F. circle, formed by this battery of gas burners, is a shipper shaft pinion destined to become a vital part of a LIMA shovel. This heat, the succeeding water quench and controlled tempering process, establishes a uniform hardness up to two inches in depth to the teeth and teeth base of the pinion. This means longer serviceable life to this important part.

Flame and induction hardening are used on rollers, gears and shafts of every LIMA machine. Heat treating, used with our know-how, is one of the reasons why LIMA is known throughout the world for quality—cost-conscious equipment men everywhere are saying, "you can depend on a LIMA for low maintenance and less down-time."

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston ring type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation.
4. Anti-friction bearings at every vital bearing point.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

The above advantages contribute to LIMA'S greater output, less down-time and lower maintenance.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

LIMA Type 2400—6 yd. shovel removing overburden in open pit mine.

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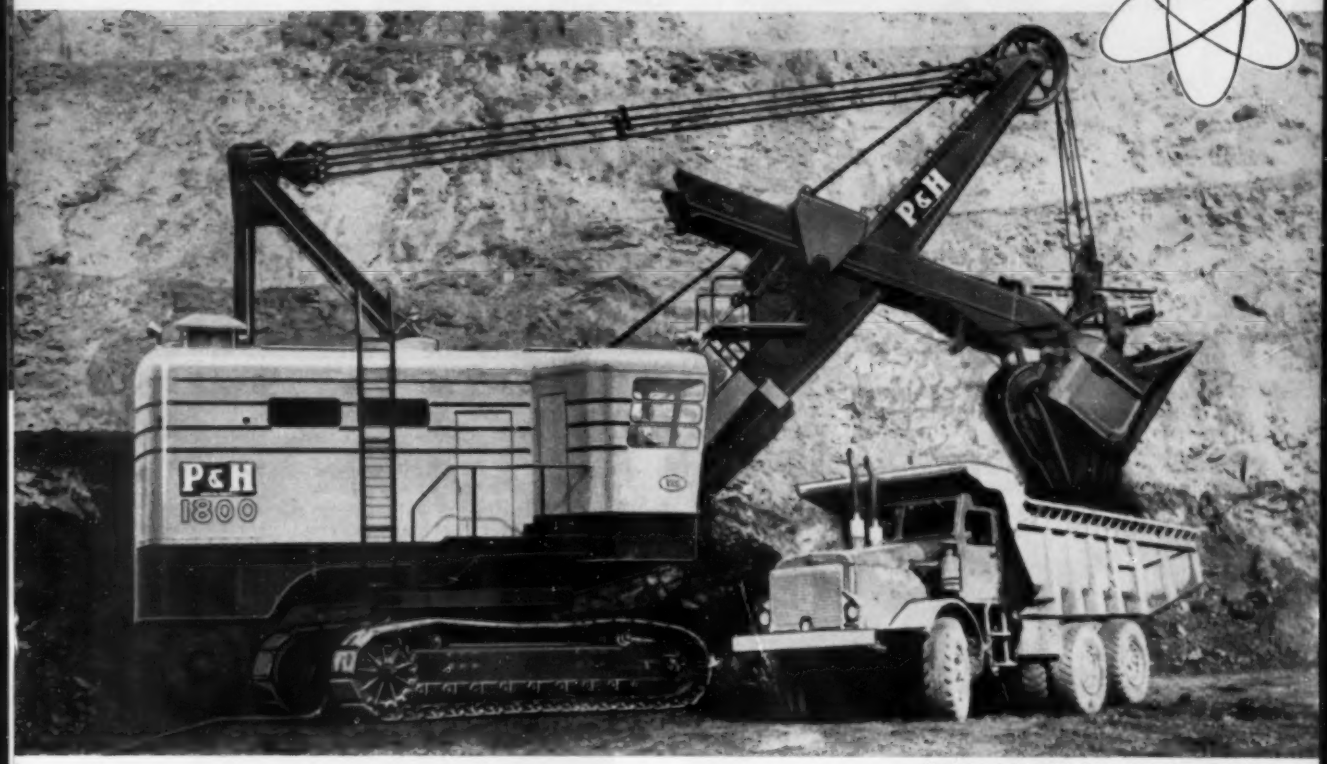


P&H Model 1800 (8 Cu. Yd. Capacity)

a great forward step in Electric Shovel performance

ELECTRONIC CONTROL — using grid control thyraton tubes for the first time on any electric shovel. Applied to all operating motions! Results in finer performance characteristics . . . more rapid response . . . better co-ordination for the operator . . . from 5% to 10% faster cycle. Thoroughly proved in more than 5 years of field installations as well as on military aircraft and combat vessels. Now standard equipment on all P&H Electric Shovels — ready to give you increased production, lower tonnage costs!

THE 1000th MAGNETORQUE*! The most highly advanced means of power transfer yet developed — now proved on P&H Shovels in the most severe types of service. Here's smoother operation, extra power, greater bail pull. Electromagnetic operation makes it friction-free, wear-free, worry-free! Magnetorque lasts the life of the shovel.

ONE RESPONSIBILITY. All electrical equipment on P&H Electric Shovels is designed and built specifically for shovel service — not adapted for it. And P&H, the builder, takes the entire responsibility for service. There's no buck-passing among suppliers. P&H service is tailored to your needs.

Write for complete information.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

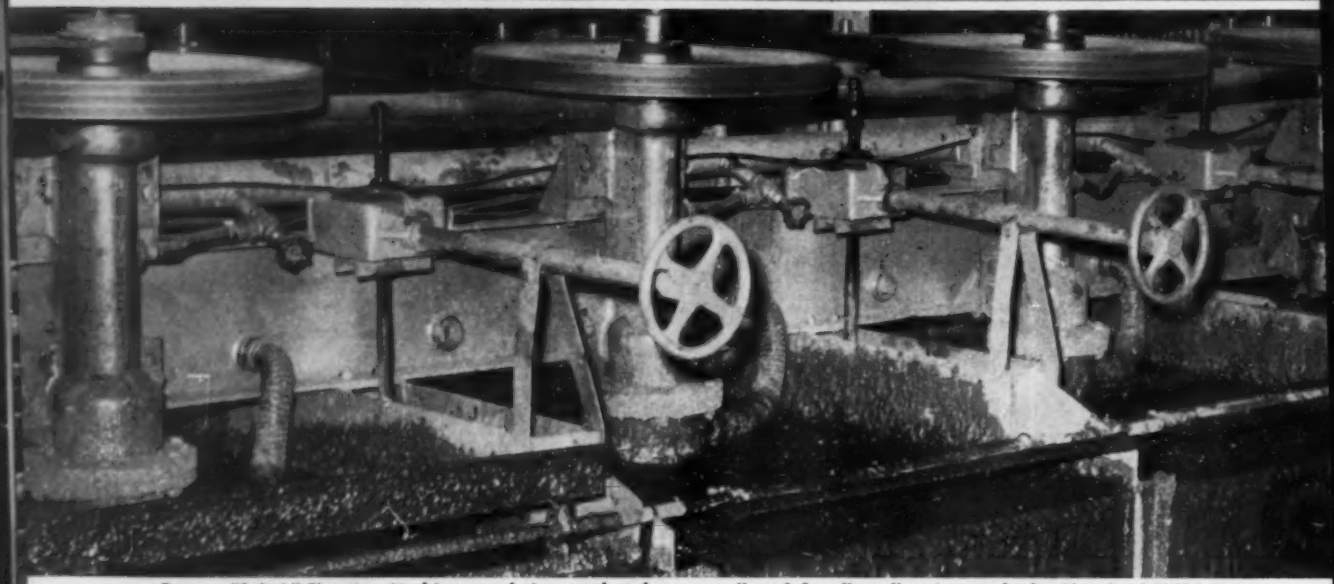
P&H ELECTRIC SHOVEL DIVISION

HARNISCHFEGER CORPORATION

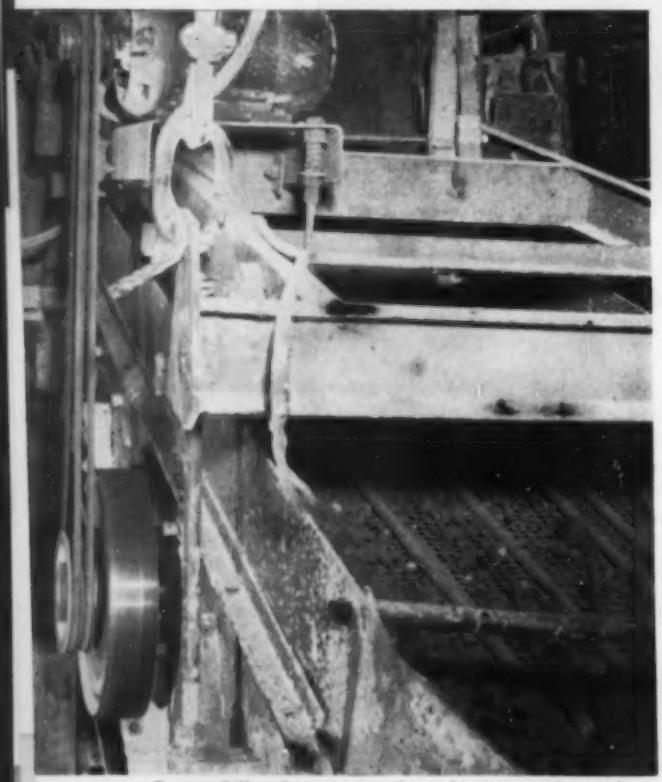
MILWAUKEE 46, WISCONSIN

the P&H Line

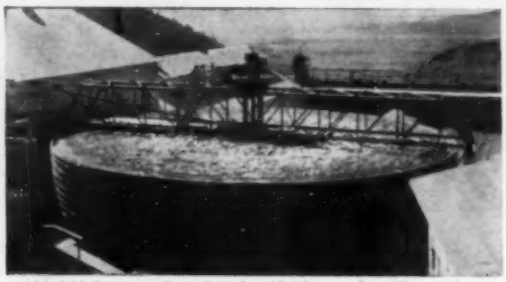
DENVER EQUIPMENT



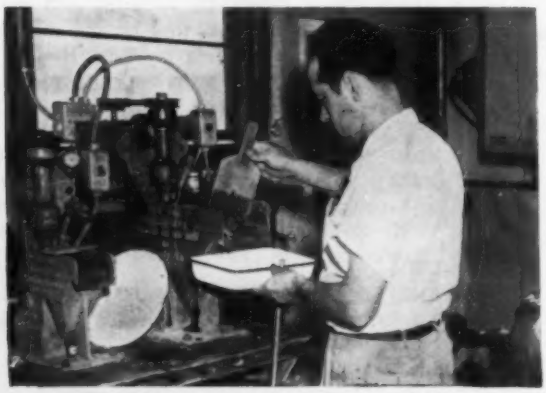
Denver "Sub-A" Flotation Machines are being used at the mill of the Humboldt Mining Co., operated by the Cleveland-Cliffs Iron Co., near Ishpeming, Mich., to float specular hematite iron ore. A fatty acid reagent is used. This photo shows a No. 24 (43x43) Denver "Sub-A" Flotation Machine in the Rougher Circuit. This bank of cells incorporates both cell-to-cell and free-flow flotation methods. Cleveland-Cliffs' Humboldt Mill is also using Denver "Sub-A" Flotation Machines for cleaners and recleaners. Additional information on how Denver "Sub-A" Flotation and Denver "Sub-A" Super Rougher Flotation Machines handle large tonnages is available. We want to help you solve your metallurgical problems. Item 311.



Denver-Dillon Screens give fast, clean separation without blinding. You get an even, smooth flow of material because of the patented "true-circle" action. Two bearing construction gives up to 50% savings in power. This mill photo shows the even distribution of the oversize—no blinding. Item 313.



60'x12' Denver Spiral Rake Thickener handling Fluorspar middlings from cleaner flotation cells. Patented Denver Spiral Rakes tend to eliminate overload due to their rapid removal of settled solids. Underflow metered with Denver Adjustable Stroke Diaphragm Pump. Item No. 315.

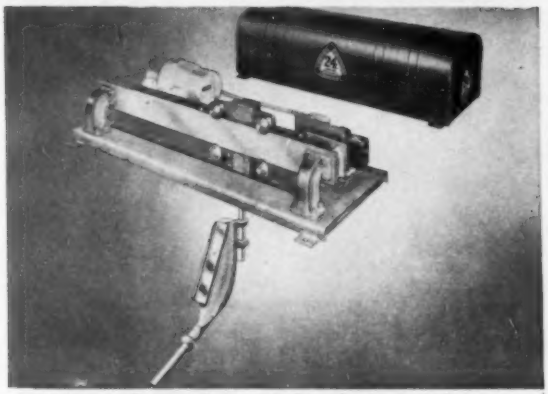


Denver "Sub-A" Laboratory Flotation Cells are used extensively by companies all over the world to check mill operation and maintain careful mill control. If you need lab equipment DECO has a complete stock—or you are welcome to use the Denver Laboratory Service for batch or continuous tests, or other problems. Item No. 317.

"The firm that makes its friends happier, healthier and wealthier"

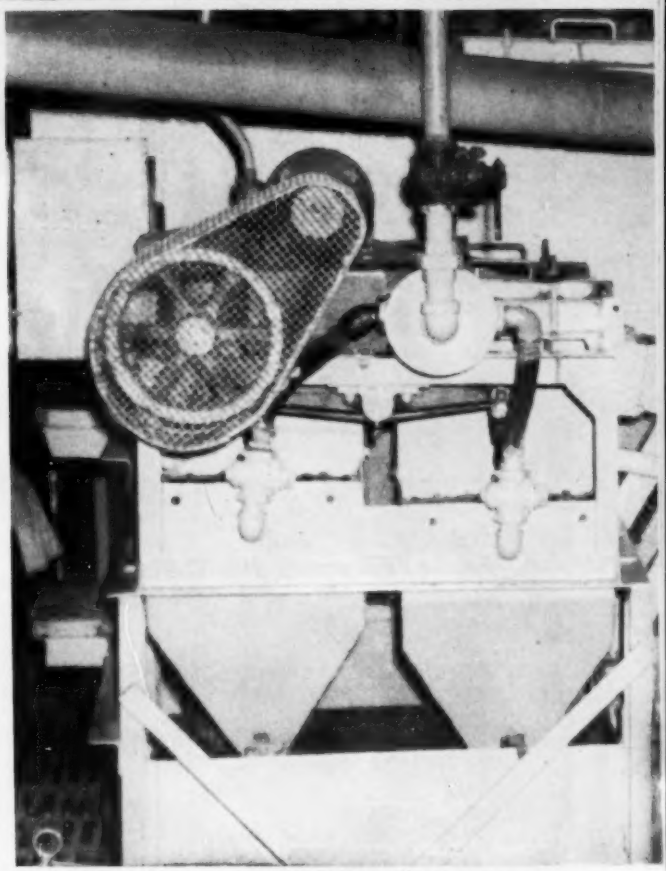
DENVER EQUIPMENT CO. 1400 17th St., Denver 17, Colorado

IN THE NEWS . . .

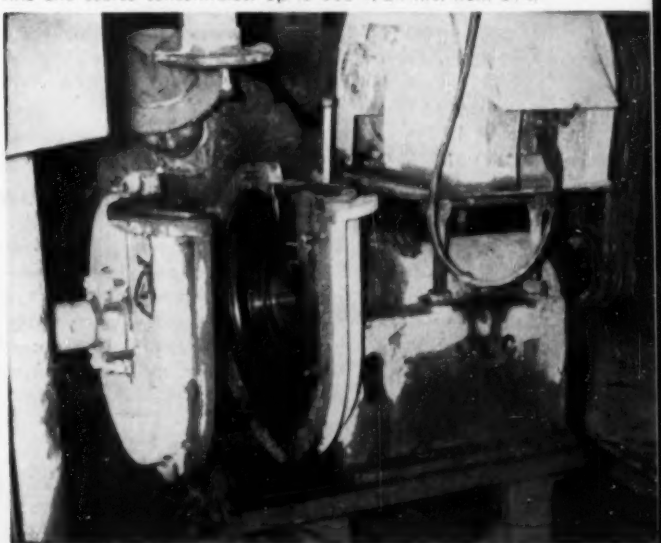


Cutter on Denver Automatic Sampler is carried on rugged ball bearing roller assembly, replacing old-style sliding contact. Rolling carriage allows the cutter to move through the stream of material to be sampled at a uniform speed. Frequency of sample cutting easily regulated. This gives accurate percentage samples, always. Item No. 316.

The 1955 Denver Wall Calendar and Mill Chart, and the 1955 Denver Annual Diary are being sent to everyone on our DECO Trefoil mailing list. If you would like to receive these two useful items, and DECO Trefoil, without cost to you, please send us your name immediately. Item No. 318.



By recovering the minerals as coarse and as soon as possible, Denver Selective Jigs avoid losses by over-grinding and sliming. Denver Jigs handle unclassified feed, make both fine and coarse concentrates. Up to 800 T/24 hrs. Item 314.



This Denver SRL Pump is mounted on a sliding base—making it easy to move pump back for quick inspection or parts replacement. Rubber - bonded - to - steel lining not only gives longer wearing part life, but also increases efficiency and lowers horsepower requirements. This 3"x3" Denver SRL Pump is used to pump cleaned zinc concentrates to cyanide circuit. Item No. 312.

WRITE TODAY, FOR ADDITIONAL INFORMATION . . . Please request additional information by the Item Number.

COLORADO SPRINGS, 300 South Sawatch Street, Phone MElrose 3-7158
DENVER 17, Box 5268, 1400 17th Street, Cable DECO, Phone CHerry 4-4466
CHICAGO 1, Bell Building, CEntral 6-2423
NEW YORK, Empire State Bldg., Cable DECOYORK, Phone Chickering 4-6510
EL PASO, 201 West 7th Street, Phone 3-8371
SALT LAKE CITY, P. O. Box 705, Phone 84-8012
TORONTO, ONT., 220 Bay Street, Cable DECOTOR, Phone EMpire 3-8836
VANCOUVER, B. C., Credit Foncier Building, Phone Marine 4918
LONDON, EC2, 15-17 Christopher St., Finsbury Square, Cable DECOLON, Phone Bishopsgate 3373
MEXICO, D.F., Avenida Juarez 16, Phone 21-1477
JOHANNESBURG, Broadway & 9th, Bez Valley, Cable DECOJO, Ph. 25-7931

this simple idea cuts V-Belt costs

— as a V-Belt bends, feel its sides change shape!

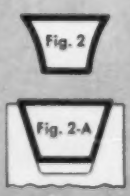
Pick up *any* V-Belt that has straight sides (Fig. 1) and bend it as if it were going around a pulley. At the same time, *grip its sides* with your fingers! You will feel the sides *bulge out* as in Fig. 1-A. Clearly, the bulging belt is forced to press *unevenly* against the V-pulley—and this concentrates wear at the points shown by arrows (Fig. 1-A).

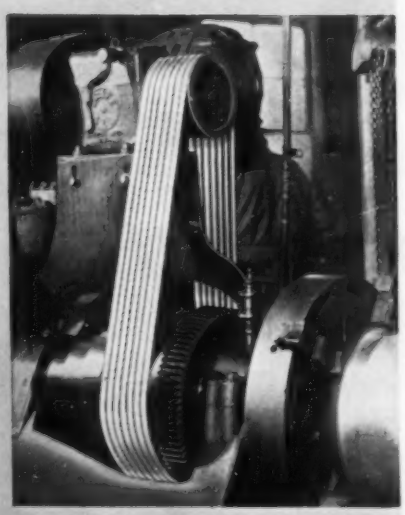
Now bend the belt with CONCAVE SIDES

(U.S. PAT. 1813699)

. . . the GATES VULCO ROPE (Fig. 2)

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means longer belt life and *lower* belt costs for you!





Typical Gates Vulco Rope Drive—the Gates V-belts are built with Concave Sides to insure longer belt wear.

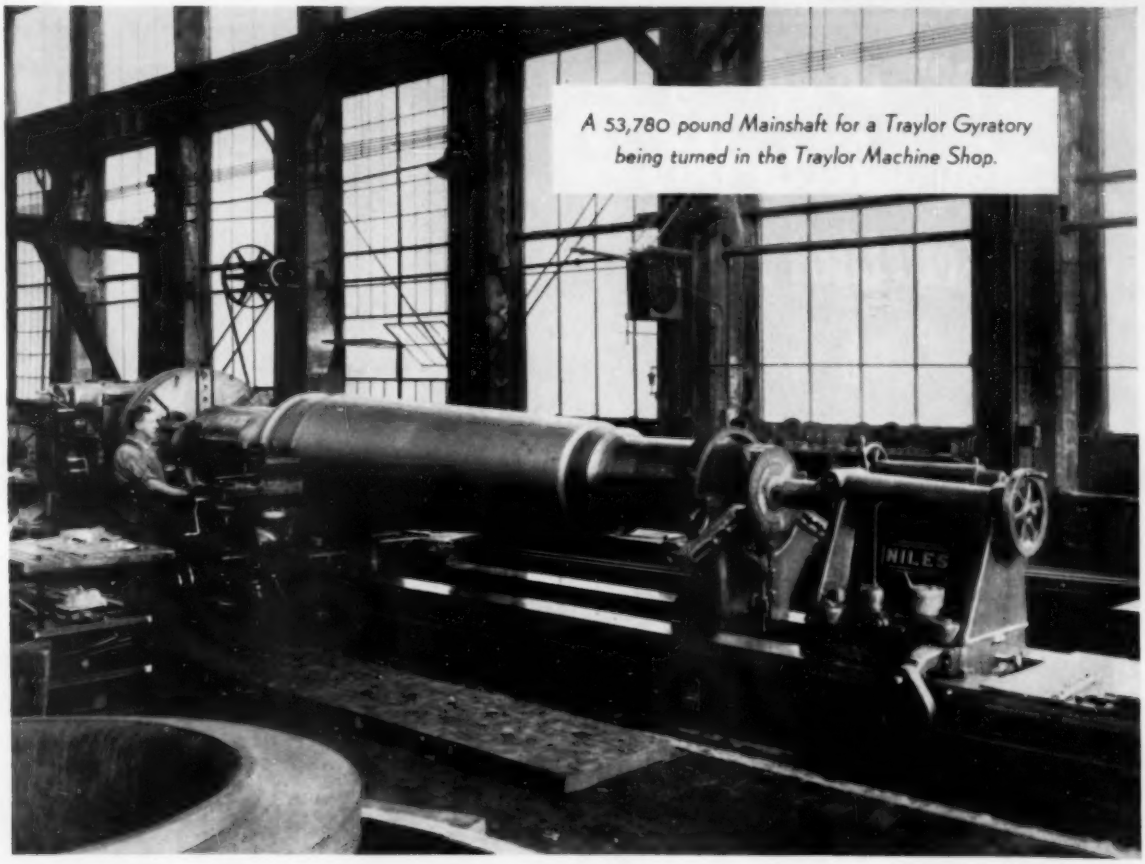
When you buy V-belts, be sure to get the V-belt with the CONCAVE SIDES — the Gates Vulco Rope!

Gates

VULCO ROPE DRIVES

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

THE GATES RUBBER COMPANY
DENVER, U.S.A.
CR-8411



A 53,780 pound Mainshaft for a Traylor Gyratory being turned in the Traylor Machine Shop.

Everything is "turned" to your advantage

...AT TRAYLOR

One big advantage of buying Traylor machines is the personal follow-through your order receives. Only by machining all parts in our own plant is that safe-guard possible. There is no split responsibility in a "Traylor-made" machine. By specializing in equipment for the Mining and Chemical Processing fields, we have been able to concentrate our resources into developing one of the most modern, fully equipped plants in existence for building this type of machinery. Yet Traylor is not so big that the personal touch is lost. Every machine we build is "Traylor-made" from the ground up. That's only one advantage of "Traylor-made" equipment. Investigate the many other advantages next time you buy Mining or Chemical Processing Machinery.

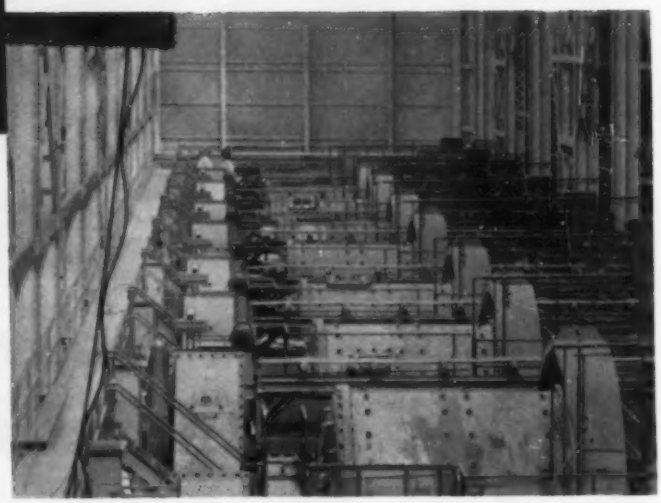
TRAYLOR ENGINEERING & MFG. CO.
703 Mill St., Allentown, Pa.
Canadian Mfrs.: Canadian Vickers, Ltd., Montreal, P. Q.

A Traylor leads to greater profits

SEND FOR BULLETINS
. . . just mention the Traylor Equipment that interests you.

SALES OFFICES · NEW YORK · CHICAGO · SAN FRANCISCO

copper company again selects this cost-cutting team of AKINS CLASSIFIERS and Marcy Mills



HAS USED TOTAL OF 116 AKINS AND 114 MARCYS

This leading copper company bought its first Akins Classifier in 1925 and its first Marcy Mill in 1918. Based upon the successful performance of this equipment they have continued ordering Akins and Marcys for their many plants... have used a total of 116 Akins Classifiers and 114 Marcy Mills. The new mill shown above includes 20, 54" Duplex Akins Classifiers and 8, 10' x 10' Marcy Ball Mills.

Sales Agents:
Andrews and George Co., Inc., 5 Shiba Park, Tokyo, Japan
Continental Sales and Equipment Co., Hibbing, Minnesota
Edw. J. Nell Co., Manila, P. I.

COLORADO IRON WORKS CO.

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colo.

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

Akins—the ORIGINAL spiral type classifier.

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

22-ton "Eucs" with quarry bodies haul stone for Ideal Cement Co. of Colorado. Top speed of this Model 36 TD, with full payload, is 32.5 m.p.h. Spring mounted drive axle and Allison Torqmatic Drive are important factors in stepping up production and profits at this operation.

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

Higher Availability
More Tonnage
Lower Costs

On scores of mine and quarry operations all over the world the high job availability of Euclid equipment results in more tons hauled per shift. Because they're engineered and built for the toughest off-the-highway service, "Eucs" stay on the job longer, with less time out for servicing and repairs.

Dependable low cost hauling has made Euclid the preferred equipment for open pit operations in both the metallic and non-metallic mining fields. If you're interested in cutting your hauling cost for ore, overburden or waste, have your Euclid distributor prepare a production and cost estimate for your operation. There's a good chance he can show you how to haul more tonnage at lower cost.

Rear-Dump models are available in 10, 15, 22, 34 and 50 ton capacities with engines of 165 to 600 h.p. . . . semi-rigid or spring mounted drive axles . . . standard transmissions or Allison Torqmatic Drives.

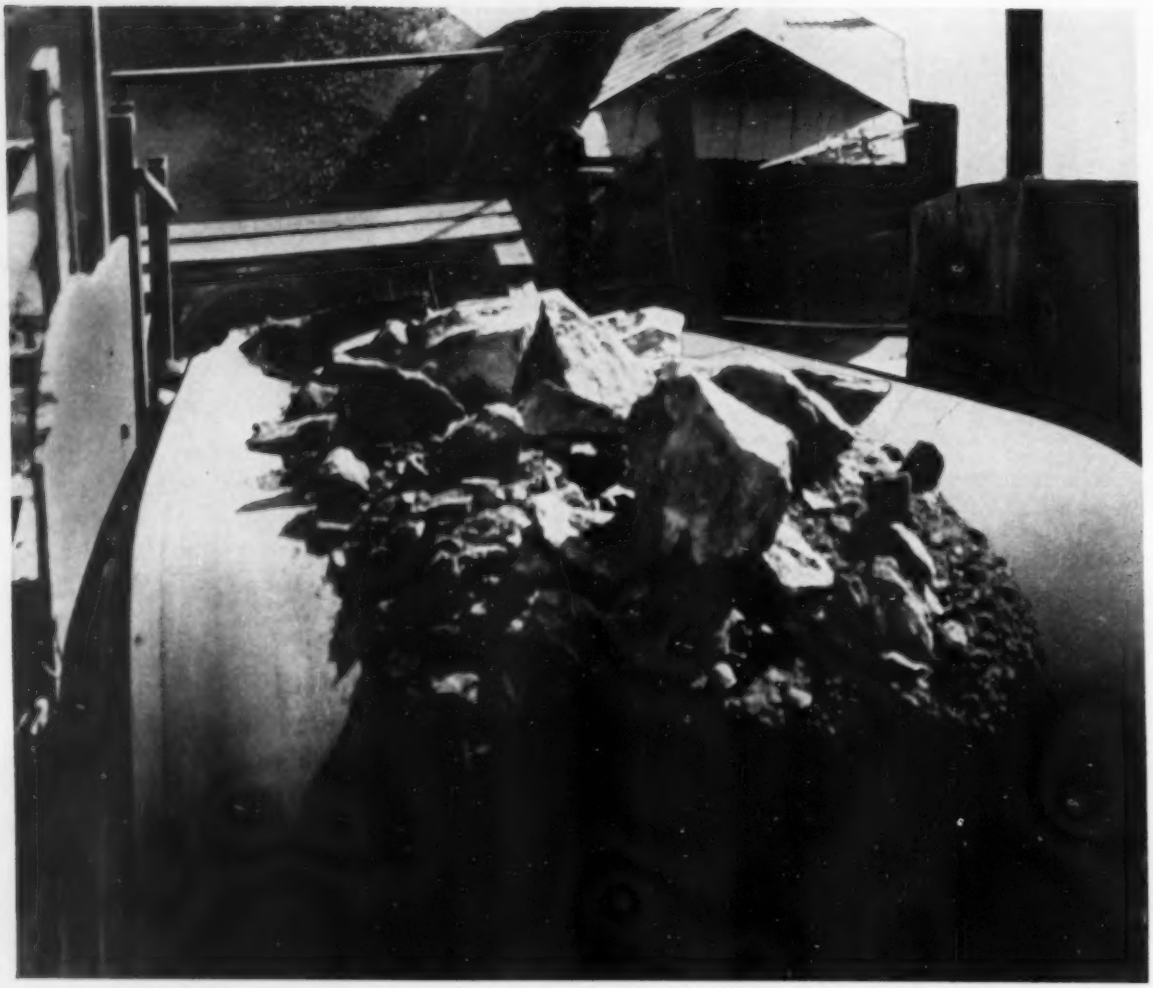
Cable Yuklid - Code Bentley

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID THE PIONEER

GM GENERAL MOTORS



New Conveyor Belt Combines Increased Strength With Extra Flexibility

Rugged Mainliner - Conveyking conveyor belt is engineered for tough jobs involving high tensions, high lifts and long center distances. It's ideal for conveying aggregates, coal and ores. It's steel-like in strength, practically stretchless, yet extremely flexible and troughs easily.

Mainliner belts have about twice the strength of ordinary cotton duck belts of the same gauge. They resist the destructive action of water, oil, weather and age. Why? Because these belts are made of multiple plies of strong duck with Nylon woven across the width and a new-process, high-strength cotton woven lengthwise, with skim coats between plies. They are available in any lengths, with any number of plies, in widths up to 72".

Like other heavy duty belts, these Mainliner Conveyking belts are custom made to meet particular requirements of individual jobs. They can be made with a cover tensile strength of 3500 to 4000 pounds average and a friction pull of 20 to 24 pounds average. They can also be made with a cover tensile strength of 2500 to 3000 pounds and a friction pull of 16 to 19 pounds. They are also available in oil-resistant Neoprene. All are mildew inhibited throughout. A breaker strip can be included in top cover, if specified.

We also manufacture a complete line of industrial rubber products: hose, belting, packing and moulded rubber of every construction for every need. *Through your Quaker and Quaker Pioneer distributor* our research and engineering services are always available to help you solve any industrial rubber problem. *Write for free folder and name of distributor.*

QUAKER RUBBER CORPORATION
Philadelphia 24, Pennsylvania

HKP

QUAKER PIONEER RUBBER MILLS
San Francisco 7, California

First in the field!

New Gardner-Denver 4½" Deep Hole Drill

new 4½" hammer diameter for heavy-duty underground drilling.

new drilling power for deeper long hole drilling.

new drilling capacity for handling larger diameter bits.

Big brother to the popular Gardner-Denver SFH99 Deep Hole Drill, the new 4½" SFH123 has been engineered for use with Ring Seal Shank and Sectional Drill Rods. Compact screw feed guide shell handles steel changes up to 5'. Write us today for additional specifications.

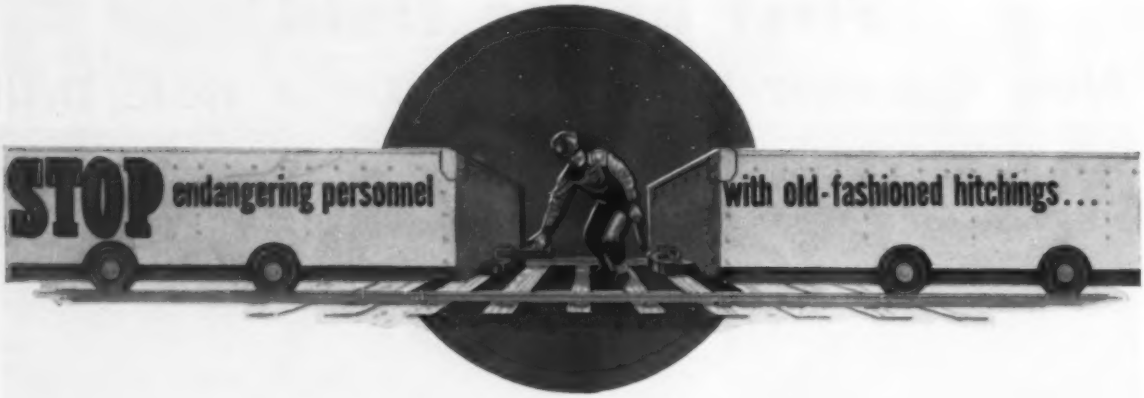
The new Gardner-Denver **SFH123** 4½" Deep Hole Drill

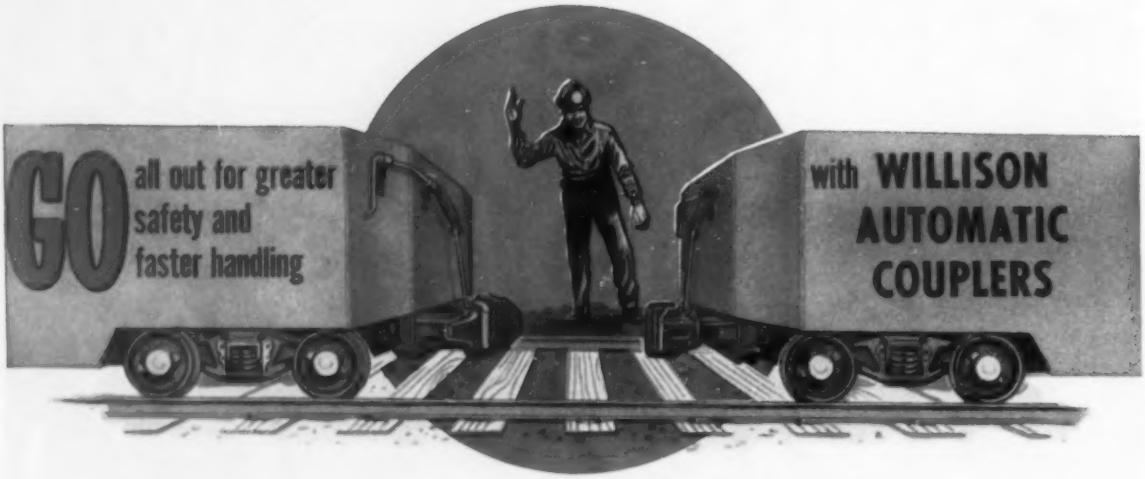
SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
Export Division: 233 Broadway, New York 7, N.Y., U.S.A.





With Willison Automatic Couplers there's no need for personnel to go between cars to couple or uncouple. That means safety—and faster handling because Willisons uncouple from either side. All Willisons couple with each other automatically—there's no matching of coupler heads.

For safety, faster handling and larger tonnages—Willison Automatic Couplers and National Multi-Pad Rubber Draft Gears.

A-9031

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

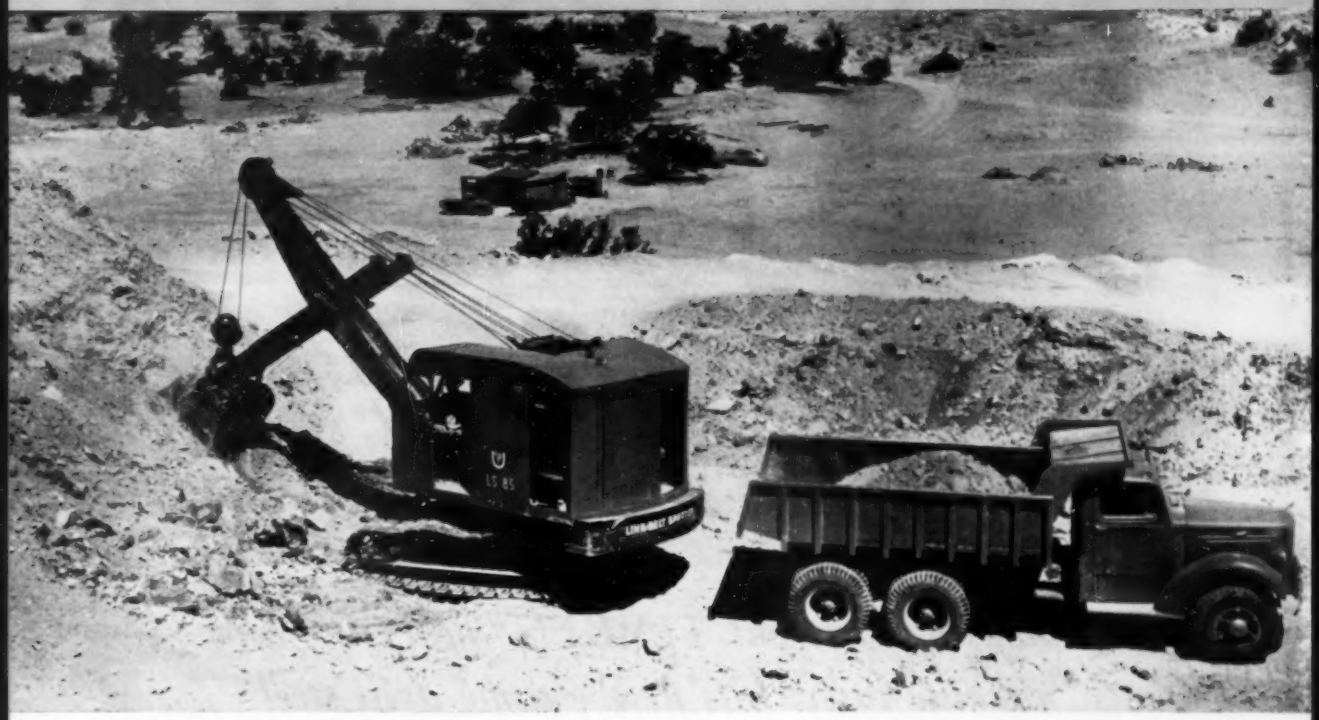
Cleveland 6, Ohio

WILLISON AUTOMATIC COUPLERS • RUBBER & FRICTION DRAFT GEARS • NC-1 CAR TRUCKS
NACO STEEL WHEELS • NACO STEEL LINKS & SWIVEL HITCHINGS

REPORT FROM HAYSTACK MOUNTAIN:

CONDITIONS: "VERY ADVERSE"

PERFORMANCE: "IDEAL POWER... TROUBLE-FREE"



High up on the Continental Divide, this ¾-yard Link-Belt Speeder loads crude uranium ore for Haystack Mountain Development Co. In eight months of week-in, week-out operation through climatic extremes and abrasive dust, its Caterpillar D318 Diesel Engine has needed *no repairs*. Ruggedness and freedom from down time are vital in this remote area, about 15 miles northeast of Prewitt, N. M.

"Our Cat* D318 is the ideal power for this equipment. It has been trouble-free in eight months of operating under very adverse conditions," states J. E. Inman, superintendent.

The Caterpillar D318 can cut *your* operating expenses with low first cost, long and reliable work life, high trade-in value. Like all Caterpillar Engines, it can deliver full power and idle without fouling on money-saving No. 2 furnace oil. The economical D318 pictured here averages only 2½ gallons of fuel per work hour!

There are 12 Caterpillar Engines and Electric Sets, to 500 HP and 315 KW. Your Caterpillar Dealer—who provides fast, dependable service and genuine factory parts—will help you select the power that's "tailor-made" to fit *your* needs. And the next time you order new machinery from mining equipment manufacturers, specify Caterpillar power.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Illinois, U.S.A.

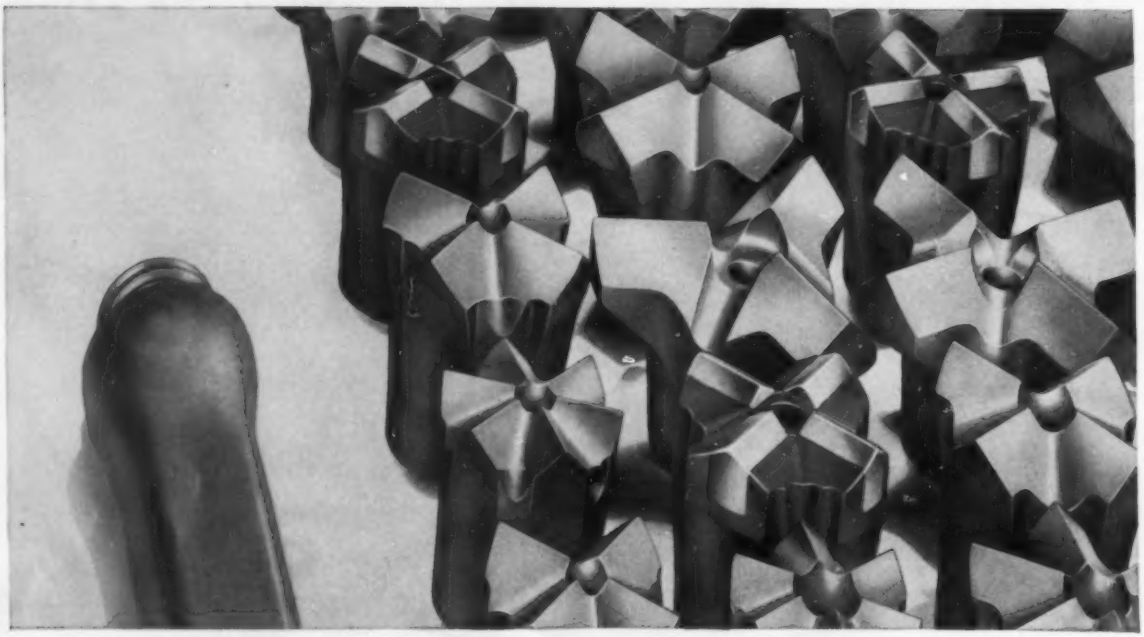
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE

SAVE TIME! SAVE MATERIALS! SAVE MONEY!

One drill steel does dozens of jobs when you use TIMKEN® interchangeable rock bits



Dozens of different TIMKEN® multi-use and carbide insert bits fit the same drill steel

NO need for your men to waste valuable time going after a different set of drill steels whenever they switch to a different type bit. In less than a minute, they can unscrew one type of Timken® rock bit and screw a different type on the same drill steel.

Timken rock bits make it easy for you to get the advantages of switch-bit drilling. They make it easy for your men to switch to the most economical bit as the ground changes —right on the job. And because dozens of different Timken multi-use and carbide insert bits fit the same drill steel, you'll be able to cut way down on your materials inventory.

Both Timken multi-use and carbide insert bits give you two distinct advantages: (1) they're made from electric furnace Timken alloy steel; (2) a special shoulder union keeps drilling impact from damaging threads.

If you want some help on drilling problems, call on our rock bit engineers. They're recognized experts in cutting costs, and their suggestions won't cost you a cent. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

HOW TIMKEN MULTI-USE BITS SAVE YOU MONEY

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.

WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant gage holes, small diameter holes, very deep holes.

... your best bet for the best bit... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

Standard Engineer's Report

CASE HISTORY

PRODUCT Calol Vistac Oil

FIRM Victorville Lime Rock Co., Victorville, Calif.

One grade of oil ends desert heat-range problems!

CALOL VISTAC OIL 14X is the only lubricant tried that stays on pistons and other air-tool parts in spite of extreme temperature changes at the Victorville Lime Rock Co.'s quarry at Victorville, Calif. Temperatures range from 0°F. to 120°F. in this desert area, often change as much as 75° from early morning to afternoon. Oils previously used failed to stay in place except in a narrow range of temperature. Calol Vistac Oil 14X prevents excessive wear, sticks on bearing surfaces and helps keep them clean although tools constantly work in heavy abrasive dust around drills above.

REMARKS: Quarry is in natural deposit of exceptionally pure calcitic limestone. Rock is ground to fine calcium carbonate, used for paint fillers and extenders, and for many other applications.

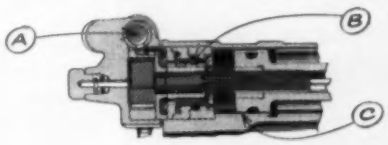
FREE CATALOG: "How to Save Money on Equipment Operation" will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your distributor, write or call any of the companies listed below.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

How CALOL Vistac Oil cuts cost in air-tool equipment



A. Atomizes quickly and completely—carries evenly over all parts. Does not fog excessively and has no unpleasant odor.

B. Additives help form tenacious oily, pressure-resistant film in wet or dry conditions—cuts wear and power loss. Small quantity lubricates efficiently.

C. Resists high temperatures and oxidation. Stays fluid at low temperatures.

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P. O. Box 780 • Denver 1, Colorado

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CF&I

steel products for the mining industry

WICKWIRE ROPE

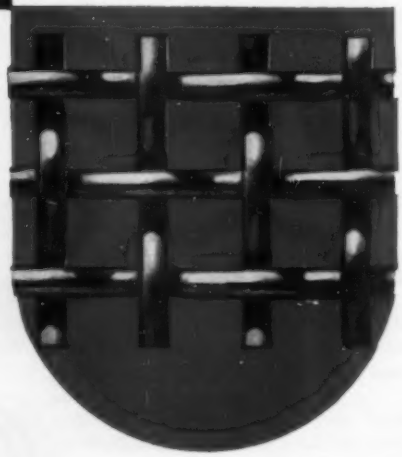
Wickwire Rope is a high-quality product recognized for over half a century for its dependability. There is a type for every application. Wickwire Rope combines toughness with fatigue resistance and will provide safety and long life.

CAL-WIC INDUSTRIAL SCREENS

CAL-WIC Screens are fabricated in a wide range of types of the toughest steels and alloys. Whether for processing, cleaning, grading, filtering or screening, for any type of equipment, you will always get the results you need for efficient operation with CAL-WIC Screens.

CF&I ROCK BOLTS

Here is the modern mine roof, wall and back support that means clear, safe mining with a minimum expenditure of labor and materials. Available in the Pattin expansion shell type or the slot-and-wedge type.



THE COLORADO FUEL AND IRON CORPORATION
Denver and Oakland

WICKWIRE SPENCER STEEL DIVISION
New York, New York

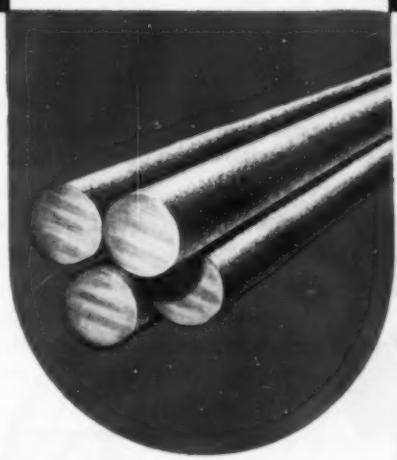
CF&I quality steel products for the mining industry are manufactured under the most rigid quality control. Important to you, as well, is the fact that these products are in everyday use in our own mining operations. This is an additional assurance of products made *well* and made *correctly*.

CF&I GRINDING RODS

CF&I Grinding Rods are rolled from special analysis steel and are machine-straightened with square-cut ends to give efficient and economical grinding.

CF&I GRINDING BALLS

Your mill will operate efficiently and economically when you use CF&I Grinding Balls. Forged from special analysis steel, CF&I Grinding Balls have the ideal balance between toughness and hardness, resulting in optimum grinding ability as well as in maximum wearability.



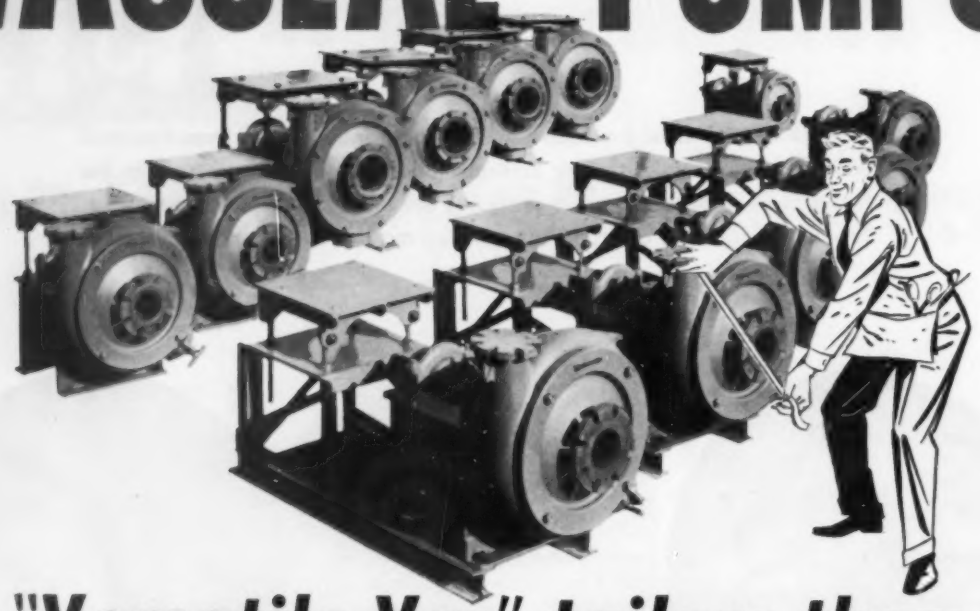
CF&I MINE RAILS & ACCESSORIES

Rails are available in a range from 12 to 45 pounds and are made to A.R.A. standards. Accessories include splice bars, angle bars, spikes and track bolts and nuts—both square and hexagon.

THE COLORADO FUEL AND IRON CORPORATION

CF&I

VACSEAL PUMPS



"Versatile Vac" tailors them to all industrial requirements

Size and Capacity for Heads from 0 to 150 feet:

2" - - - 50 to 190 g.p.m.
3" - - - 150 to 500 g.p.m.
4" - - - 300 to 700 g.p.m.
6" - - - 500 to 1500 g.p.m.
8" - - - 800 to 3600 g.p.m.

Other Galigher Products

Commercial and Laboratory AGITAIR
Acid-proof Sump Pumps
Laboratory Ball Mills
Geary-Jennings Sampler
Geary Reagent Feeder
Laboratory Pressure Filters

With all the efficiency you would expect of a pump specialized for materials handling, Vacseal pumps are 'tailored' for ALL kinds of pumping jobs in ALL industrial operations.

They can be rubber-lined, hard-iron or special alloy: acid proof or standard . . . providing a full range of handling abrasive or corrosive pulps. Motor mounts can be above or back of the pump or in practically any special position desired.

All Vacseal Pumps have the NO-SEALING-WATER feature that prevents dilution and damage so often due to failure of clear water supply.

Vacseal records of performance is a story you should certainly acquaint yourself with before choosing a pump for any use. May we send you our BULLETIN PB-52? No charge.

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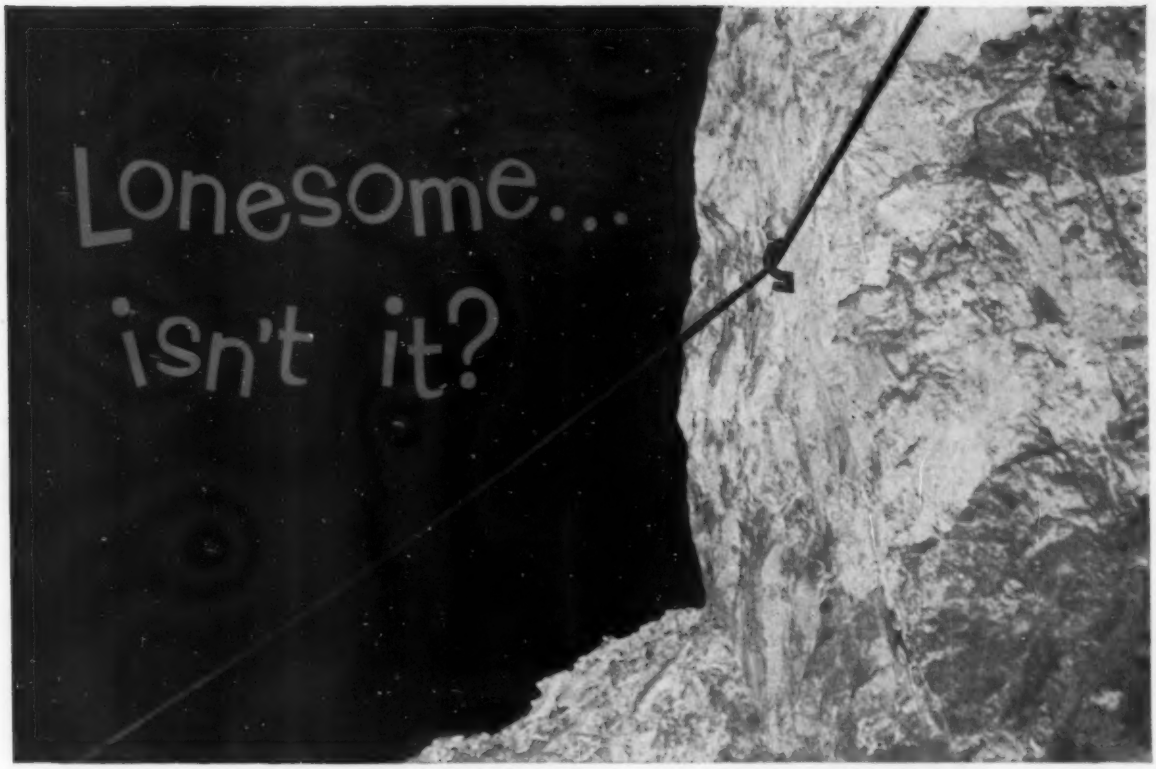

Photo courtesy American Zinc Co. of Tennessee

This Simplex-TIREX Cable carries 250-volt D.C. power to a 25-horsepower slusher hoist 800 feet from the main power line. The cable runs from pillar to pillar and is supported every fifty feet by a cane-shaped hanger wedged into the pillar.

The scraping of many hundreds of tons of ore per day rests upon the consistently satisfactory performance of this lone cable. Here is an operation where "cost cutting" by buying cheap cable simply cannot result in profit. Dependable day-in, day-out operation are primary requisites. Profits rest on it.

Simplex-TIREX Portable Cables are quality cables. They are engineered and manufactured to meet the toughest, most difficult operations that mining affords. They will withstand the blows of falling ore, spalling rock, etc. TIREX Cables were first made more than 35 years ago to meet and overcome the problems peculiar to mining. That's why you will find TIREX wherever you find mining.

Simplex-TIREX Cords and Cables are cured in lead to give you longer service. They are the only cord or cable that have the famous Selenium Neoprene Armor. When you next need a portable cable for slusher hoists, for loading operations, for electric locomotives, or for any other mining service, be sure that you specify and then insist that you get Simplex-TIREX Portable Cables.

Simplex

TIREX CORDS AND CABLES *are made only by the*

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CALL ON STANDARD

A ten-foot diameter *Standard* kiln is pictured above, ready to be shipped to its Louisiana destination. Lower photo shows kiln shell mounted on flat cars. Another car carries the enclosing furnace, trunnions and running gear.

Although by no means the largest kiln to be completed by *Standard*, it is a good example of our ability to design and build rotary processing equipment of any size—LARGE or SMALL.

In this, our 50th Anniversary Year, we take pride in the fact that for precision engineering and fabrication of heavy duty machinery, the call is so often for *Standard*.

Rotary KILNS

COOLERS
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Another BIG OUTPUT Walking Dragline

Here's big news for men engaged in strip mining or heavy-duty construction work — Bucyrus-Erie has added another big-yardage, all-weather dragline to its world-famed "walker" line. You'll find unequalled money-making features in the new 400-W . . . here are some of them.

THREE POWER COMBINATIONS — Your choice of heavy-duty diesel engine, electric power with independent motor-driven drums, and electric power with clutch-operated drums.

EFFICIENT FRONT END — All-welded boom has T-section chord members with tubular bracing for maximum strength, minimum deadweight. Fast filling, clean carrying, quick dumping buckets help assure big output.

LONG WORKING RANGE — Without throwing bucket, material can be moved 405 feet with the 400-W's 200-ft. boom and 7-yd. bucket, 377 feet with the 185-ft. boom and 8-yd. bucket, and 351 feet with the 170-ft. boom and 9-yd. bucket. Digging depths range up to 135 feet.

RAPID OPERATING CYCLE — Fast hoisting and lowering with powerful air-controlled clutches and brakes . . . rapid acceleration and deceleration of the swing under variable-voltage Ward Leonard control.

EXCEPTIONAL MANEUVERING ABILITY — With exclusive Bucyrus-Erie walking mechanism, the 400-W walks where you want it, when you want it, in good weather or bad, even on ground that's too soft for other machines.

STRONG RIGID BASE — Provides 748 sq. ft. of bearing area for full stability in working and walking.

STURDY MAIN MACHINERY — Is simple in design . . . is arranged for accessibility in servicing and maintenance, and for maximum counterbalancing effect . . . is rigidly held in accurate alignment on deep-section revolving frame.

Complete information is yours for the asking — write today!

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South Milwaukee, Wisconsin

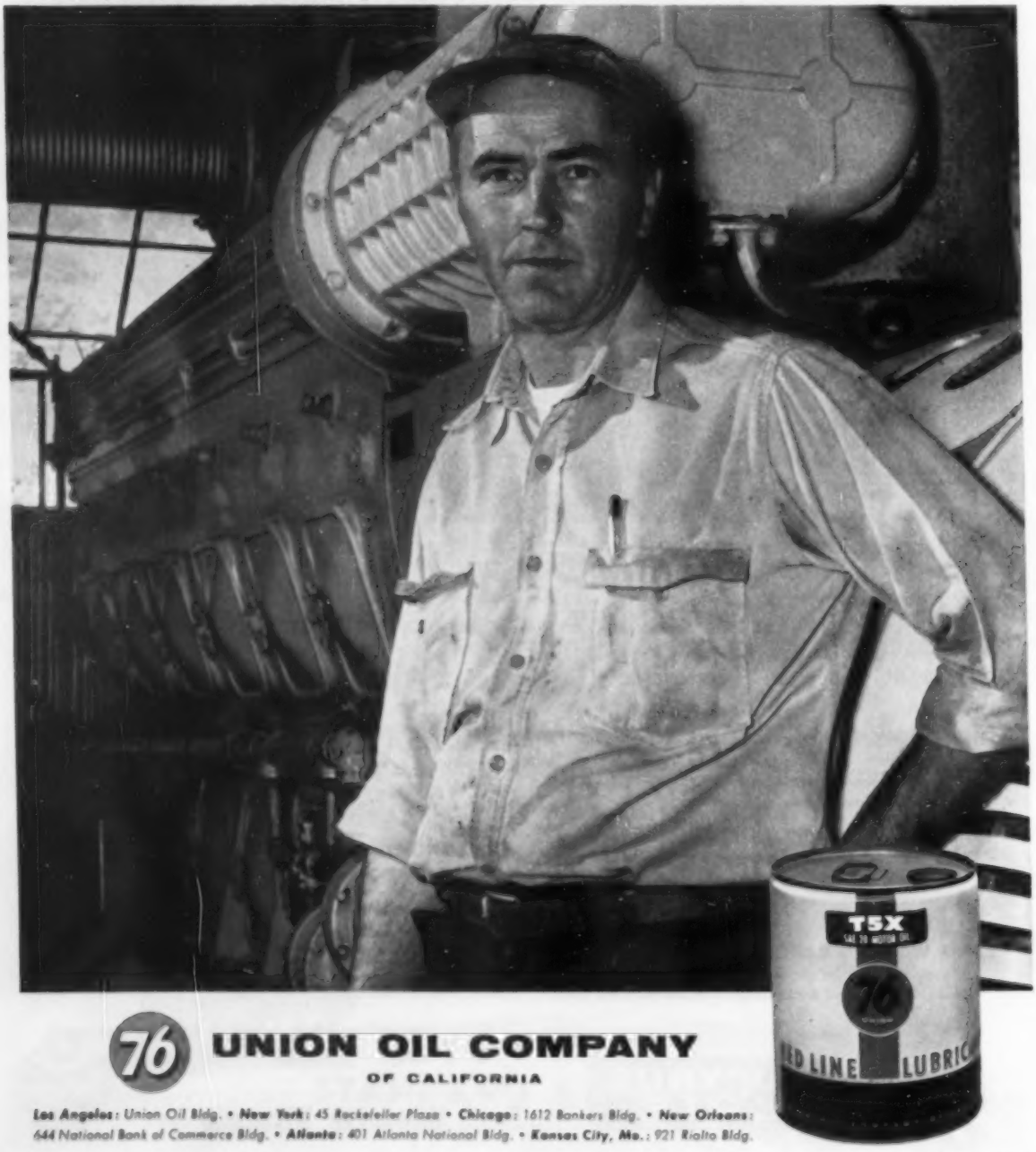
"T5X...the only oil you could sell me."

"This is one of three of our G.M. 900-h.p. diesel generator sets. We've always used T5X in them with excellent results. At the time this picture was taken the thermometer in our power house read 135°. It gets hot here in the Nevada desert.

"The other day we overhauled this diesel after 8500 hours — the bearings and crankshaft showed practically no wear and the liners 'miked out' with only .0025" wear. After 8500 hours, I think this is terrific. Union's T5X motor oil is the only oil you could sell me."

Power plant foremen all over the West agree — for stationary diesels there's nothing quite like T5X. And this amazing purple motor oil is available for immediate delivery from your nearby Union Oil representative.

Ed Cox, power plant foreman, Wah Chang Mining Corp., Tempiute, Nevada



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Drifts and Crosscuts

Senator Anderson Reports On Uranium

When the 84th Congress convenes on January 3rd the Democrats are scheduled to organize the Senate and make Committee assignments. Senator Clinton P. Anderson of New Mexico is expected to be named chairman of the joint Senate-House Committee on Atomic Energy.

The mining world is fortunate that a westerner from New Mexico, where uranium mining is so important, will head this committee. He has a wide knowledge of the uranium industry and has prepared this special review of the domestic uranium industry for MINING WORLD*'s readers.*

In recent months production of uranium ore and uranium concentrates in the United States has surpassed previously established record levels and at present this country is among the world's leading producers. Stimulated by discoveries of large uranium ore bodies, interest in prospecting and exploration for uranium has increased significantly. Many large and long established mining companies as well as competent small organizations and individuals have entered the uranium mining industry which in the brief period of six years has assumed a major position in western minerals production.

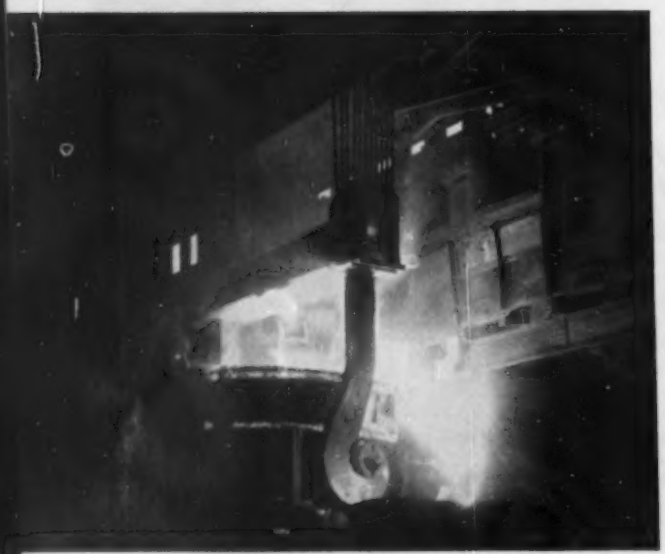
The principal domestic producing area is the Colorado Plateau embracing portions of the states of Colorado, Utah, Arizona, and New Mexico. In addition to this major area there has been increasing interest and active exploration with some production in Wyoming, South Dakota, Montana, Nevada, and California. Some years ago small quantities of uranium for ceramic and other uses were derived from carnotite deposits of the Uravan Mineral Belt in western Colorado. This was the obvious starting place for exploration and production when the critical need for uranium developed. The search for this material vital to defense needs began in earnest early in 1948 when the United States Atomic Energy Commission announced that it would buy from domestic sources all the uranium produced during a given period at guaranteed minimum prices. It also established an active exploration program to locate new deposits, entered into contracts with existing mills for the treatment of ore and production of uranium concentrates and brought one government owned mill into production. While interest in the program has been stimulated and sustained by the government through provision of incentives in the form of guaranteed market, production bonuses and other forms of assistance, the recent spectacular growth is primarily due to the greatly expanded activity of private industry.

In Colorado this is reflected by increased exploration, drilling and mining by many companies and by expansion in capacity of processing plants operated by Vanadium Corporation of America, United States Vanadium Corporation, and Climax Uranium Company in an endeavor to meet the all-time high output of the mines in this area.

Major discoveries in Utah at Big Indian Wash, San Rafael Swell, and White Canyon principally by individual prospectors have centered attention on the need for additional processing facilities in this state. Plans are well advanced for the construction of a large mill at Moab and the expansion of the Commission-owned plant at Monticello. Ores from Marysvale, Utah and other areas are shipped to Salt Lake City for treatment in the plant of Vitro Uranium Corporation which also is being expanded. Ore buying stations have been established at Moab, and at White Canyon near Hite, to provide a market pending the completion of milling facilities for the ever increasing flow of ore.

In New Mexico private exploration activity by Haystack Mountain Development Company, a subsidiary of the Santa Fe Railroad, and by Anaconda Copper Mining Company have resulted in the discovery of extensive deposits of uranium. Anaconda's Mill at Bluewater, New Mexico which went into operation in 1953 to treat uranium bearing limestone ores is being expanded. In addition construction has started on a new, much larger unit to process sandstone ores from the Laguna Indian Reservation. This unit is expected to be ready for operation by the end of 1955. A new uranium mill at Shiprock, New Mexico just completed by Kerr-McGee Oil Industries has commenced operation. This plant has been doubled in capacity since construction started in 1954 and will obtain much of its ore supply from the Navajo Indian Reservation in Arizona. Several successful, small, uranium operations are being conducted in the Grants area and promising prospects have been found in many other parts of the state. With completion of all facilities under construction, New Mexico will rank with Colorado and Utah in importance as a source of uranium.

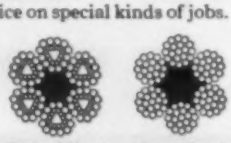
We have witnessed in the past six years an impressive increase in domestic uranium ore production and the discovery of new deposits. This has been coupled with the development of improved exploration and ore processing techniques. Completion of contemplated new mills and expansion of existing processing facilities now underway will permit full realization of the substantial gains which have been made. The domestic uranium industry is now firmly established and in a position to supply an ever increasing proportion of our total uranium requirement.



PROVING EXTRAORDINARY SERVICE—A Hercules Flattened Strand crane rope delivered 18 months service, compared to 6 months for ordinary rope. It performed equally well as a clamshell bucket rope. On a hot ladle crane it outlasted round strand rope by 4 to 1, and still tested at higher-than-rated strength. It was chosen for its super strength to haul the car on the continent's largest cableway at Kitimat.

Can Flattened Strand solve your special wire rope problem?

Hercules Flattened Strand is a special kind of wire rope that provides extraordinary service on special kinds of jobs.



Flattened Strand Round Strand

The key to the difference is the triangular shape of the strands. Notice how the strands support each other; how the rope circumference is almost perfectly round; and how the core is smaller. There is 10% more steel in Hercules Flattened Strand than in round strand ropes of the same diameter. That means *10% more strength* and *10% greater safety*. Flattened Strand wears longer and more evenly . . . and is easier on sheaves and equipment.

If you can use this Super-rope, you'll soon begin saving time, labor, money. Why not investigate?

Because Leschen pioneered and perfected Hercules Flattened Strand wire rope, Leschen is your best source of additional information. Ask your Leschen man, or write for "The Flattened Strand Story."

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Capitol Concentrates

Eisenhower Administration's Mineral Policy Drawn By Cabinet Committee

The President's Cabinet Committee on Mineral Policy has completed its work and submitted its report which has been endorsed by President Eisenhower. The recommendations, therefore, become the Eisenhower Administration's mineral policy.

The basic theme of the report is the necessity for maintaining a strong peacetime domestic mining industry as a base for mobilization in time of war. Specific recommendations for accomplishing this objective are lacking, however, or are given in most general terms.

The report suggested that the government keep a watchful eye on the "supply-demand" situation in each domestic industry. If production in a vital industry drops so low, or threatens to drop so low, as to endanger the industry as a base for future wartime expansion, the United States government should make "the best use of all the various existing authorities" to maintain or achieve the desired production level, said the report. And if the Administration doesn't have sufficient authority, it should go to Congress for the needed legislation.

The first part of the committee's recommendations dealt with long-term stockpiling of strategic and critical minerals. This part of the program is already in effect in accordance with the President's policy statement of March 26, 1954 ordering greater purchases of materials for the national stockpile and has been applied specifically to lead and zinc.

The committee recommended greater tax aid, although claiming that real progress was made in that direction by the tax revision bill passed by the last Congress. Other recommendations included:

Continuation of the present program of financial assistance and loans for mineral exploration; a stepped-up program of mapping, geologic research and mineral research by the Interior Department; enactment of public land laws necessary to encourage the use of the "newer methods" of exploration; and greater cooperation between government and industry to achieve the desired results.

The President's Cabinet Committee on Mineral Policy was named by President Eisenhower in October of 1953. It consisted of Secretary of Interior McKay as chairman, Secretary of State Dulles, Secretary of Commerce Weeks and Defense Mobilizer Flemming.

• Goals Completed on 30 Materials

The Senate-House Committee on Defense Production has reported that the government has achieved its goals on 30 of the 75 materials being acquired under the stockpiling program. Only 18 materials, it says, are now less than 50 percent of the established targets.

Total market value of the minimum stockpile objectives for all 75 materials is nearly $6,800,000,000, the committee reported.

While most of the scarce materials of a year ago are now in free supply, said the committee, ferroalloys remain on the "critical" list. Nickel, tantalum, selenium, titanium, and strategic mica were mentioned as being the scarcest of the critical materials. Selenium was selected as one of the most critical materials in the over-all stockpiling program, and titanium as the largest incomplete program in terms of dollars. The military uses about 90 percent of the titanium supply, primarily for production of jet engines.

• Policy Discussed With Manufacturers

Assistant Secretary of Interior Felix Wormser discussed the Administration's mineral policies when officials of the Department of Commerce met with representatives of the mining machinery manufacturing industry.

Concerning stockpiling, Wormser said that the long-range program undertaken for lead and zinc had alleviated distress in those industries far more than action under the "escape clause" would have done. He insisted that the industry need have no fear that stockpiling of metals and minerals would be used by this Administration to control those industries. He also emphasized the point that stockpiles must be held for military purposes and not used as "buffer" stocks which eventually might be dumped on the domestic market.

• SBA Approves First Metal Mine Loan

Hurray! Hurray! At long last the Small Business Administration, after having granted 953 loans to other small businesses, has announced that a direct loan of $56,000 has been approved to the Klamath River Chrome Company in California, the very first metal mining loan to be granted. Of course, jubilation may be premature. Experience with the latter-day RFC was that loans often were advertised as approved but the terms were so onerous that the applicant refused to draw down the money. Miners have had no SBA experience prior to this loan for the mining and concentrating of chrome ore.

• Stockpile Statement Is Confusing

The Office of Defense Mobilization has issued a statement which the press described as a move "to clear up some of the confusion that has existed concerning the various stockpile objectives." Such an explanation is long overdue but, unfortunately, ODM failed to explain the peculiar elasticity of these objectives and how they are made to bend in conformance with the blowing of economic and political

LET REPUBLIC SUPPLY YOUR NEEDS!

He said: "That's right, the brain's got pains. Sounds to me like growls from the valves, and maybe a gear loose in the rear. Can you fellows help me?"

We said: "What model and IQ number—brilliant, genius or mental giant? We've got just what you need in stock!"

Moral: Even a mechanical brain knows that Republic Supply has most types of industrial products, standard and special, in their huge warehouse stocks. Whether it's an everyday abrasive you need, or a once-in-a-year splicing needle, you'll get it faster from Republic!

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winds. At any rate the explanation was not very illuminating.

Objectives are listed as minimum, long-term and supplemental. Of the minimum objectives it is stated that when ODM took over from the Munitions Board some were decreased, some remained as they were, and others were increased. As stockpile objectives have always been subject to periodic revision, it cannot be said that this statement by ODM has thrown any additional light on the subject. Long-term objective quotas, over and above the minimum objectives, must be obtained in the Western Hemisphere, ODM said, and at prices most advantageous to the government, at least where domestic sources are concerned. This limitation probably means that supplies will not be bought in the United States when the United States cost of production of these items is more than the open-market world price (as manganese, tungsten, chrome, etc.), or of items the world market price of which ODM considers too high (as mercury).

On the whole, long-term stockpiling seems to be not much more than an abortive gesture so far. In the case of lead-zinc purchases, it is not known whether the recent acquisitions are for the minimum or long-term objectives, but in any case it seems that purchases will be gauged in such a way as not to float prices above what the ODM experts consider satisfactory. What strikes and acts of God may do to prices is another matter, but the opinion around Washington is that ODM will quit buying if lead and zinc prices advance much above the present levels.

The term "supplemental objectives" is a new one to most people. Supplemental supplies are only to be acquired when our surplus agricultural products are peddled in exchange for foreign currencies and we can, in turn, purchase foreign strategic and critical materials with such currencies. As no such currencies are available at present for this purpose, and may not be for some time, how much supplemental material will be acquired is, to say the least, problematical.

What is the state of your confusion now?

• Conference Report Is Available

The Mid-Century Conference on Resources for the Future, which created such a splash in Washington last December, has issued a $5.00 report entitled "The Nation Looks At Its Resources." While we have not read every word, preliminary releases indicate the report urges more study of resources, 432 pages not being enough!

COMING CONVENTIONS

February 3 through 5, 1955. The 55th Annual Convention COLORADO MINING ASSOCIATION and affiliated groups. Shirley Savoy Hotel, Denver, Colorado.

February 7, 8, and 9, 1955 McINTYRE-SARANAC CONFERENCE, Saranac Lake, New York.

February 14 through 17, 1955 Annual meeting AMERICAN INSTITUTE OF MINING ENGINEERS, Conrad Hilton Hotel, Chicago, Illinois.

March 7 through 11, 1955, Joint meeting AMERICAN SOCIETY OF PHOTOGRAMMETRY and AMERICAN CONGRESS ON SURVEYING AND MAPPING, Washington, D. C.

April 19 through 21, 1955. Annual meeting CANADIAN INSTITUTE OF MINING AND METALLURGY, Royal York Hotel, Toronto, Ontario, Canada.

FLOW SCHEME SPECIALIST AT YOUR ELBOW

Cyanamid Field Engineers stand ready to work with you in developing the best flow scheme for a new mill or adjusting your present methods to meet changing conditions. They bring you the composite experience gained through similar work throughout the world—plus the latest findings of the Cyanamid Mineral Dressing Laboratory.

Also, a re-study of your ore-dressing methods may show that newer Cyanamid Reagents, alone or in combination with older reagents, may make a worthwhile contribution to better recovery, lower costs or both. You may benefit also by adding Heavy-Media Separation or the Dutch State Mines Cyclone Separator Processes.

To serve your everyday needs, orders for Cyanide, Flotation Reagents and auxiliary chemicals may be placed with our New York office or with American Cyanamid Company, 1440 Broadway, Oakland 12, California; El Paso, Texas; c/o Weicker Transfer & Storage Company, Denver, Colorado; or c/o Goodwin & Mayflower Moving & Storage Co., Spokane, Washington.

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How to handle more material per dollar—YEAR AROUND

THIS Caterpillar No. 6 Shovel has no chance to loaf. It's shown here cutting down a bank of dirt and loading it for road-building fill at Scott County Stone Co., Inc., Scottsburg, Indiana. In addition, it stockpiles and loads crushed rock—keeping busy the year around, no matter what the weather or the ground conditions.

Many owners of No. 6 Shovels also use them for stripping and loading overburden, grading, excavating and cleaning up. Underground, its low over-all height, freedom from overhead clutter, and turning ability enable the No. 6 to put out plenty of work in tight places. With its long bucket reach, the No. 6 Shovel easily loads high-sided hauling units.

One reason for the high work capacity of the CAT* No. 6 Shovel is its carefully engineered balance. Weight distribution, horsepower and bucket capacity are matched so that with capacity loads the tracks are on the ground providing traction from sprockets to front idlers. Another reason: the two-yard bucket tips back 35 degrees in the first few feet of upward travel after loading, so it retains a heaping load of even loose materials, and dumps *clean*.

Bucket controls are well-placed and designed for easy, accurate operation. Ralph B. McNeely, operator of the shovel in the picture, says, "I can do a big day's work with little effort. This machine is powerful, easy to handle, and has good visibility at all times." This fast and easy operation cuts costs. Further savings result from the ability of the rugged Cat Diesel Engine to deliver full and *foul-free* power for only pennies per hour on inexpensive No. 2 furnace oil, thanks to its exclusive, Caterpillar-built fuel injection system.

Your Caterpillar Dealer will demonstrate *on the job* the shovel that will do the most work for *you* at lowest cost. See him today. And count on him whenever you need skilled service and genuine Caterpillar parts.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

January, 1955

INTERNATIONAL PANORAMA

CANBERRA, AUSTRALIA—Prime Minister Menzies has announced that the government will pay up to $4.46 per fine ounce of gold to those mines whose costs exceed $30.00 per ounce.

GARFIELD, UTAH—Western Phosphates, Inc. is planning a 50 percent increase in production of treble superphosphate and ammonium phosphate by doubling capacity of its phosphoric acid plant. Phosphate rock production from company mines in Idaho and Wyoming will also be increased.

ELIZABETHVILLE, BELGIAN CONGO—Union Miniere du Haut Katanga, operator of the Shinkolobwe uranium mine—the world's largest, has joined the Atomic Industrial Forum, Inc., a United States association dedicated to the peacetime advancement of atomic energy.

TORONTO, CANADA—In its first year GECO Mines Limited has developed ore reserves in three bodies in the Manitouwadge Lake district containing 14,899,000 tons assaying 1.72 percent copper, 3.55 percent zinc, and 1.73 ounces silver per ton.

MUFULIRA, NORTHERN RHODESIA—A new monthly production record of 340,800 tons of copper ore milled has been set by Mufulira Copper Mines Limited.

HITE, UTAH—Cerro de Pasco Corporation, largest Peruvian mining firm, is getting into uranium. The firm has optioned 52 claims 14 miles south of here and plans diamond drill exploration.

SINGAPORE—Exports of columbite from Malaya to the United States from March to November were 46.23 tons valued at $867,284.

ARTESIA, NEW MEXICO—A new potash mine and refinery for the Carlsbad Basin are planned by the National Farmer's Union and Kerr-McGee Oil Industries. A mine shaft will be sunk east of here to develop the potash bed.

JOHANNESBURG, UNION OF SOUTH AFRICA—During the first nine months of 1954 seven gold mines and several monazite producers exported $25,571,812 worth of uranium and thorium. For the same period in 1953 value was $5,708,214. Production is growing and in September production was valued at $2,699,354.

WALLACE, IDAHO—Second largest DMEA exploration contract in the Pacific Northwest is being undertaken by Hecla Mining Company at the Silver Mountain Lead Mines' property east of Mullan. Bunker Hill & Sullivan Mining and Concentrating Company of Kellogg is a partner with Hecla in an operating agreement with Silver Mountain.

SINOIA, FEDERATION OF RHODESIA AND NYASALAND—Newmont Mining Corporation's exploration subsidiary, Sebungwe Mines and Exploration Company Ltd., will diamond drill for base metal sulphides to a depth of 1,000 feet at its optioned Copper King and Copper Queen mines.

TORONTO, ONTARIO—Diamond drilling has indicated 13,634,500 tons of 0.106 percent U_3O_8 ore at Algom Uranium Mines Ltd. at Blind River. Two 3,000 ton per day mills are planned.

JAKARTA, INDONESIA—The Gemeenschappelijke Mijnbouwmaatschappij Billiton is now operating 16 tin dredges and 21 open-pit mines.

MANILA, PHILIPPINE ISLANDS—Recent exploration has indicated a new high-grade chromite district on Palawan Island. Marsman mining interests are conducting surface and diamond drill exploration.

GRAND JUNCTION, COLORADO—A $500,000 uranium exploration program is underway by Richard O. Dulaney, Jr., and the F. Kirk Johnson interests. Major exploration is planned on claims owned by Climax Uranium Company but which will be developed by Dulaney and Johnson.

ANKARA, TURKEY—Turkish chrome will be bartered for 100,000 tons of United States wheat. The chrome will be shipped to the United States stockpile by the Commodity Credit Corporation, United States Department of Agriculture which has arranged the barter.

MONTICELLO, UTAH—Homestake Mining Company has shipped its first Utah uranium ore to the Atomic Energy Commission's Monticello mill. Ore was produced during development at the Little Beaver mine.

Utah IS&R Plant Reopens; Kennecott On 7-Day Week

Resumption of operations at International Smelting & Refining Company's Tooele, Utah lead-zinc concentrator has been announced by the company, and the lead smelter is expected to be back in operation this year. The plant was closed early last year when lead-zinc prices hit an all-time low (See MINING WORLD, September, Page 117).

Another indication of increased base metal activity in Utah is the return of Kennecott Copper Corporation to a 7-day work week. Increased demand for copper has added 500 men to the firm's Utah mine in Bingham Canyon and the mills at Magna and Arthur, Utah. The change from the 6-day week will add an anticipated 3,000 tons of copper to the current monthly rate of 18,800 tons.

ASARCO Completes New Mexican Flotation Mill

With completion of construction, operations have started at the new selective flotation mill of the American Smelting and Refining Company's Cosala unit. Located in the Cosala mining district, state of Sinaloa, on the west coast of Mexico, this 400-ton mill will treat ore from the Nuestra Senora mine. The deposit is predominantly silver-lead with a little copper and zinc. The company also plans to buy ore from the small mines in the district. L. J. Sessinger is mine and mill superintendent.

At the Rosario unit of American Smelting and Refining in the Rosario mining district, also in the state of Sinalao, the company has started exploration of the Plomosas mine containing silver, lead, and zinc. Should this work be successful, consideration may be given to erection of a plant in the area. Campbell Simpson is superintendent of this unit.

ATTENTION
Mercury Miners

A new mercury district is rapidly developing in the Philippine Islands. From early reports it could well become of world importance as a mercury source.

Palawan Quicksilver, Inc. is developing an open-pit mine near Puerta Princesa, Palawan Island, where proven near surface reserves are approximately 100,000 tons of eight-pound ore. Plans are being made for installation of a 100-ton-per-day rotary kiln.

For further information on mercury —the mystery metal, see the special MINING WORLD report starting on page 44.

NEW PRODUCER OF MONTANA TUNGSTEN has had its share of operating problems. Shown above is the stockpile, mill and tailing disposal area of Minerals Engineering's low-grade tactite development on the edge of the Boulder batholith.

How Minerals Engineering Opens Big Low-Grade Tungsten Deposit

The Minerals Engineering Company of Grand Junction, Colorado has opened up a tungsten deposit near Glen, Montana that has been described by some authorities as one of the largest in the United States. That the deposit is big is very true—but it is equally true that it is also low in grade. Sharp engineering practices have pointed the way to revival of mining in this area, bordering Montana's famed Boulder batholith. Factors which are responsible for the success of the operation are:

- Low cost mining from an open cut
- High production per man shift
- High mill recovery

Highlights of the operation include the use of air legs to drill the 50-foot-thick zone; sideswiping and undercutting of the exposed face to break a large tonnage of ore with these small drills; use of front end loading units which contribute flexibility to the operation; and careful recording of costs.

At the mill a coarse grind is required to prevent sliming of the ore. The battle for good metallurgical results with an extremely hard water supply kept company engineers on their toes. When all factors have been tallied, Minerals Engineering must be complimented for an outstanding job of developing this district with its spotty mineralization.

Two firms, American Alloy Metals, Inc. and the Minerals Engineering Company, began tungsten exploration projects almost simultaneously in 1951. Both had located claims on the same mountain—American Alloys on the northern side at Browns Lake, while Minerals Engineering concentrated on an outcrop on the southern side of Sugarloaf Mountain in the Lost Creek Area.

As work progressed in the area, it soon became apparent that a large tactite (complex silicate rocks resulting from the metamorphic effects of magmatic intrusives in carbonate-bearing sediments) zone was involved. In 1953, Minerals Engineering leased the Browns Lake property from American Alloys and began construction of a new road to the mine. At the same time construction of a plant in Salt Lake City, Utah was started to treat low-grade tungsten flotation concentrates by chemical means. This plant is owned jointly by Minerals Engineering Company and Sylvania Electric Products Company under the name of the Salt Lake Tungsten Company. Also at this time, Minerals Engineering appropriated funds to build a flotation plant at Glen, Montana to treat the low-grade tungsten ores of the district.

400 Ton Mill in 100 Days

Once the decision was made to go ahead with construction of the new mill and Salt Lake refinery, operations

at the Montana property shifted into high gear. The 400-ton mill was turning out concentrates exactly 3 months and 10 days after ground was first broken for the foundation. Construction actually started July 5, 1953, and the new mill was inaugurated November 15 of the same year. So far, ore extraction has been concentrated on the Browns Lake portion of the deposit.

Here the ore occurs along a contact of limestones and hornfels with a quartz monzonite known as the Pioneer batholith. The mineralized zone, referred to as tactite, resulted from the metasomatic effects of the intrusive and is composed chiefly of grossularite. The chief tungsten-bearing mineral is an impure, fine-grained scheelite occurring in a finely disseminated state scattered throughout the tactite. Molybdenum is known to be present and it is felt that perhaps mineralization approaches the form of powellite [$Ca(Mo,WO_4)$], rather than being strictly termed a scheelite ($CaWO_4$).

The deposit strikes nearly east-west and dips 20 to 30° into the hillside from its outcropping on the north slopes. Surface diamond drilling has indicated that the zone is over 1,000 feet in length, nearly 150 feet wide, and averages 50 feet in thickness.

An interesting sidelight on the property is that here is another case in point where old-timers had done some underground prospecting. They even had a stope or two to work the deposit for its copper values without even realizing the presence of tungsten-bearing ore. Underground workings were used to good advantage to provide openings from which drilling and further drifting and crosscutting could be used to further outline the ore.

Operational and Cost Summary For Minerals Engineering Company's Glen, Montana Open Pit Tungsten Mine and Flotation Mill for September 1954

Tons milled		12,191
Head assay (Percent WO_3)		0.403
Tailing assay (Percent WO_3)		0.035
Percent recovery		91.30
COSTS PER TON*		
Mining cost†	$2.51	
Stripping cost	2.00	
Total ore cost		$4.51
Haulage to mill		1.12
Milling**		3.30
Total		$8.93

* Includes depreciation, but not Federal taxes.

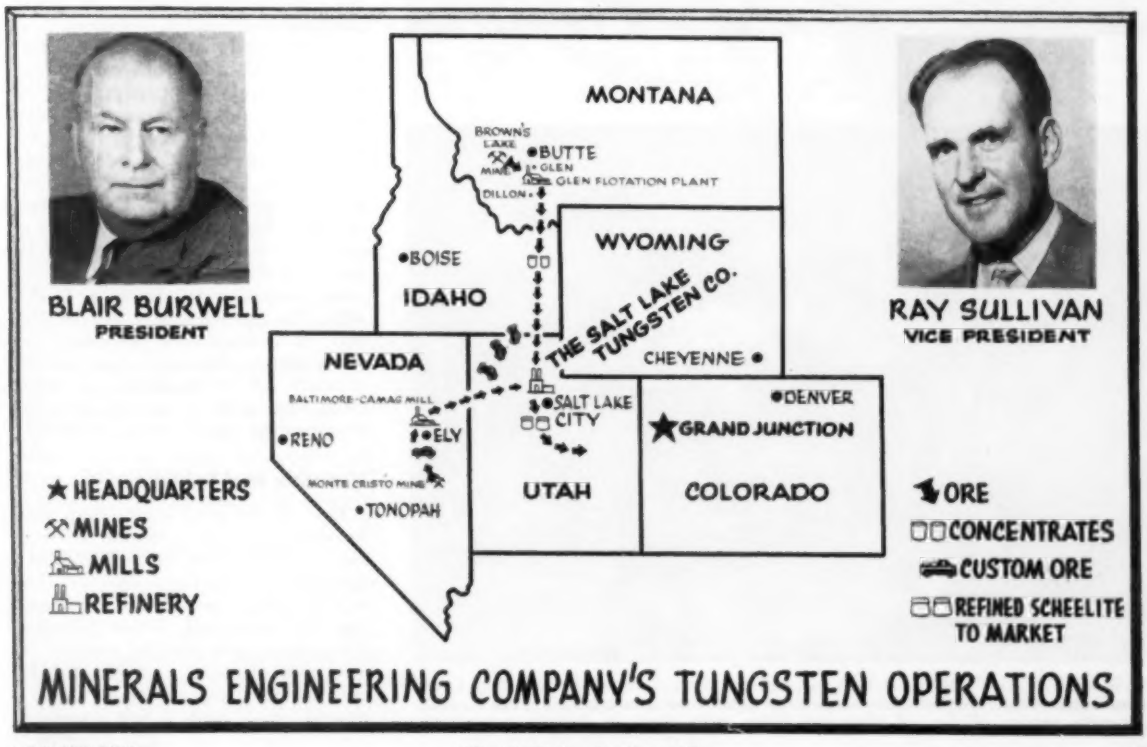
** Mill operates on a mill-wide bonus or incentive plan by which all the mill operators participate in a bonus based upon recovery over 90 percent and tonnage over 10,000 per month.

† The mine operates under a similar mine-wide bonus or contract involving $0.75 per ton of ore mined as a basis for labor contract.

Large Reserves for Open Pit

Although Minerals Engineering is mining the deposit as an open cut, they are also drifting in two different headings under the deposit to determine the extent of the ore. Why they are adopting that practice can best be explained by the fact that the deposit is low in grade (less than 0.5 percent) and company engineers can't afford to base their overall planning on the results of drill holes alone. A slight miscalculation of less than 0.1 percent one way or the other will materially affect the reserves. For the first 10 months of operation mill heads have been kept between 0.45 and 0.55 percent. The deposit as a whole averages 0.39 percent. Ore reserves of 825,000 tons available for open pit mining are now blocked out.

In the mountain range the effects of glaciation are quite apparent from the existence of broad U-shaped valleys, hanging valleys, and the presence of glacial till; in fact, glacial morraine has complicated what would otherwise be a simple workable mining operation. The deposit at Browns Lake is capped with a glacial morraine overburden. Large boulders, too large to be handled with bulldozers or scrapers, are the chief headache of mine superintendent R. N. Roby. Stripping is handled by bulldozers and mobile Tracto-Shovels, with block holing of boulders necessary. Near the eastern end of the deposit the caping of glacial morraine is 60 feet thick. The stripping ratio at the moment, while working in a thinner layer of



overburden, approximates 1.5 or 2.0 to 1.0.

Mining—Cheap—Effective

The steepness of the terrain and topography are used to good advantage by Minerals Engineering, with a high production per man shift maintained. Work began on an outcropping section where a road and maneuvering area for trucks and loading units were first carved out of the face of the extremely steep mountain side. Once the deposit is stripped, the mining problem becomes so simple that one can readily understand how this operation can pay off on such low-grade ore. Briefly the system consists of side-swipeing and slabbing off portions of the 50-foot face using air-leg drills. No benches, as such, are established but drillers use existing muck piles to set-up for a new round. At times, where the method is applicable, an undercutting round near the base of the ore is drilled to kick loose a large tonnage of ore from the face. This method, of course, leads to more secondary blasting, but the large tonnage obtained per man shift (25 tons) with a low initial capitilization for drill equipment, together with the extreme flexibility of the system, more than offsets the disadvantage of secondary blasting. The main road bed which bottoms a few feet below the deposit serves as the loading area or, perhaps more properly, the one and only bench as the face retreats with mining.

The highly mobile jackleg (Gardner-Denver No. 48 air leg and drills are used here) has really proved its worth at this property. The 1-inch hexagonal steel with an integral chisel-shaped carbide insert has given good service and lends itself readily to on-the-job sharpening. These are made at the Junction Bit and Tool Company's shop at Grand Junction, Colorado and are reset from two to three times at the Minerals shop.

DRILLING THIS ROUND with an airleg setup from a muck pile will enable mine superintendent R. N. Roby to maintain his high production per man shift. Flexibility in mining and a low capital outlay for equipment have slashed production costs.

NEW BURWELL-EIMCO FILTER, pointed out by mill superintendent Earl Craig, is an outstanding contribution to metallurgy. This unit is a highly improved, semi-automatic version of the old plate and frame press, used to dewater concentrate.

Variety of Loading Units

Ore broken from the face is loaded by an Allis-Chalmers HD 5 Tracto Mobile (front end loader) and by a ¾-yard Northwest Diesel shovel. These track-mounted units contribute both reliability and high-speed loading operations at the mine. More and more smaller producers are finding these or similar machines highly advantageous from the standpoint that they get the job done with a low capital outlay. Recently Minerals Engineering acquired an Eimco 105 loader. This item with the wide (6-foot) mouth and 1½-yard bucket has proved advantageous for handling some of the larger boulders encountered in stripping.

Compressed air for drills is furnished by a Gardner-Denver 600-cubic-foot-per-minute compressor; another 500-cubic-foot-per-minute portable compressor serves as a standby. Pit operations are carried on one shift per day which keeps the mill supplied with sufficient ore to run at its 400-ton capacity. Mack trucks supplied by a contractor haul an average load of 19 tons over the 9½-mile route from the mine, located in the foothills, to the mill. This gravel base road, by the way, is surfaced and maintained in top condition, although in many places it could only be classified as a single track road with occasional turnouts. However, its condition is impressive.

Flotation and Tabling

One of the most outstanding features of the entire operation was the rapidity with which the mill was constructed. A major factor affecting this was the elimination of the customary fine ore bin usually found between the crushing and grinding sections of most mills. Instead, a simple storage area which is tapped by an underground tunnel with a belt conveyor

provides the required capacity between the crushers and the mill.

Milling of the ore and recovery of the tungsten follows a simple flowsheet. Ore received from the mine is either routed to a stockpile maintained at 12,000 tons, or to a 50-ton crusher bin where it is fed by vibrating feeder to a 15- by 36-inch Traylor jaw crusher. Crusher undersize at three inch goes by conveyor to a 4- by 10-foot Allis-Chalmers Lo Head screen with oversize to a 2-foot 4-inch Traylor TY crusher. Secondary crusher discharge and screen undersize are conveyed to a 2,500-ton fine ore stockpile, located over a conveyor tunnel and draw-off feeder belt. Fine ore is fed to a 7- by 8-foot Traylor ball mill operating in closed circuit with a 60-inch Akins spiral classifier. The ball mill is charged with 4-inch forged steel balls and the grind is maintained at maximum pulp density and tonnage to reduce over sliming of the scheelite. Classifier overflow is maintained at 40 percent solids and the grind averages one percent plus-48-mesh, and 50-percent plus-200-mesh.

Flotation for Low Tailing

The classified overflow goes directly to flotation, consisting of a 41-inch Denver Equipment unit cell for conditioning or sulphide removal, thence to a 10 cell Minerals Separation bank of cells and two banks of four each Denver Equipment cells.

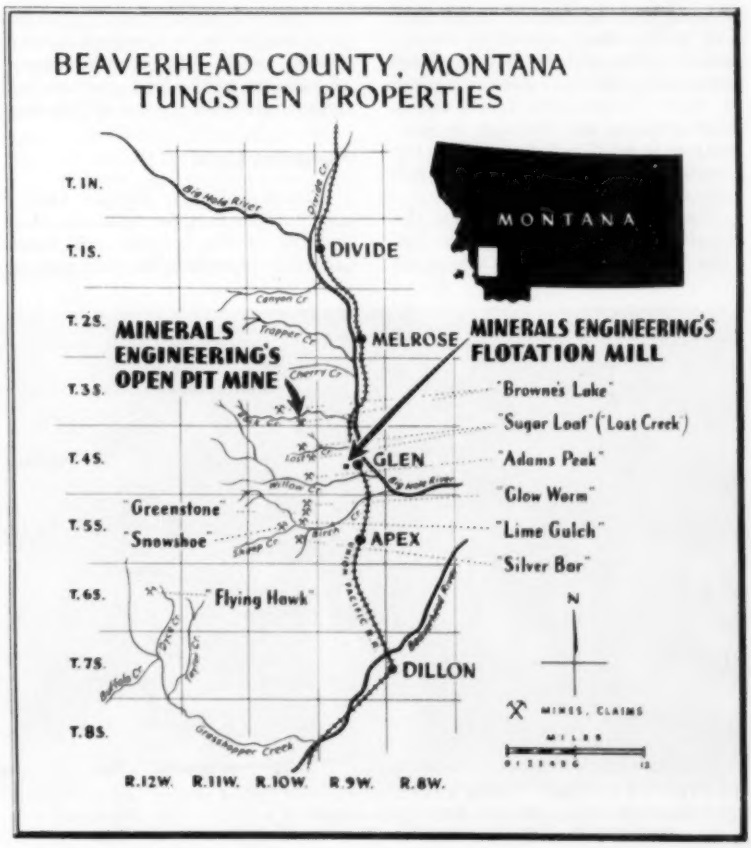
Flotation here is directed to producing a low tailing (0.03 percent WO_3) and a low grade rougher concentrate which is passed to a Diester slime table equipped with a deep pool. The table produces a 55 percent concentrate and a table tailing depleted of coarse tungsten containing about 4 percent WO_3. This table tailing is pumped to six M. S. type flotation cleaner cells where it is upgraded to approximately 8 percent WO_3. Cleaner tailing is returned to rougher flotation while concentrate is thickened, filtered on a Burwell Filter, and shipped by railroad car to the Salt Lake Tungsten plant in Salt Lake City.

The high-grade concentrate resulting from tabling of the rougher flotation concentrate averages 40 percent of the Tungsten in the mill feed and the recleaned table tailing slightly over 50 percent, making an overall recovery of approximately 90 percent.

Concentrates to Salt Lake

The high-grade fraction is shipped to Salt Lake City. In its raw state it contains 55 percent tungsten, 0.25 percent copper, 0.25 percent lead and varying amounts of phosphorus and sulphur. Because of the oxidized cop-

STRIP THE WASTE—establish one bench at the base of the ore—then start mining. This is the key to the system established at Minerals Engineering's Montana operation. Allis-Chalmers Tracto-Shovel sorts boulders for secondary breaking.



CLEARING THE WAY for more ore, this Dumptor drops its load of overburden. A new area has been opened up along the edge of the Boulder batholith by Minerals Engineering's pioneer work. Low grade ore requires close attention to costs.

per and lead, it is treated at Salt Lake City with a small amount of concentrated nitric acid in ceramic lined leach tanks, which remove impurities to meet Government specifications. After leaching and filtering, the concentrate is dried and delivered to the General Services Administration, Salt Lake City.

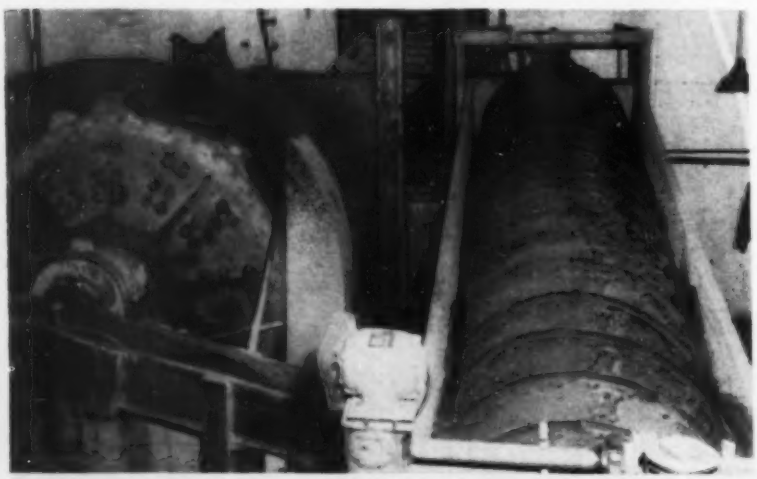
The low-grade fraction enters the chemical upgrading plant of the Salt Lake Tungsten Company, where 65 percent WO_3 concentrate is produced by a method to be described in a following article. The overall recovery of tungsten in the final products sold approximates 86 percent at this time.

Reagents Used

A soap collector, Aliphat 44E, is used for the tungsten minerals. Here the first of the tungsten mill man's axioms is important—the pulp must be kept in dispersed condition to avoid excessive consumption of the collector by calcium and magnesium ions in hard water and to allow the collector to selectively coat the tungsten minerals. Sodium silicate not only serves as a silica depressant but aids in dispersing the pulp. The purchase specifications limit the copper in the high-grade concentrate to less than 0.05 percent. For each short ton unit of WO_3, a deduction of $0.25 is made for each 0.01 percent copper in excess of this amount.

Initially, copper minerals were removed by flotation at Glen but later a nitric acid leach of the table concentrate at Salt Lake City was found to be more effective.

Soda ash is used to maintain a pH of 9.5. This reagent exerts some dispersing action and of course aids in precipitating some of the calcium and magnesium ions from the hard water. Quebracho is used for depressing carbonate minerals.



RELATIVELY COARSE GRIND is the best insurance against sliming and consequent high tailing loss at the mill. This installation consists of a Traylor 7 by 8-foot ball mill operating in closed circuit with an Akins 60-inch spiral classfier.

Ore is Abrasive

Mine run ore delivered to the mill runs about 3.2 in specific gravity. The various identified minerals which compose the bulk of the gangue are calcite, garnet, orthoclase, quartz, and chalcedony. The garnet mineralization accounts for about 80 percent of the feed. Although jaw wear in the crushers and steel consumption in the ball mill is not excessive, the garnet creates a very abrasive pulp, with a consequent high wear on pump liners, impellers, and piping. Wear on the crusher plates and in the ball mill appears to be no more than normal during the time the mill has been in operation.

Reagent Consumption at Minerals Engineering Company's Glen, Montana Tungsten Flotation Mill in Pounds Per Ton of Feed

Reagent	*Consumption*
Na_2CO_3	5.03
Aliphat 44E	1.29
Na_2SiO_3	1.30
Pine oil	0.14
Cresylic acid	0.04
Quebracho	0.01 to 0.04
Grinding balls	1.75 to 2.0

Hard Water Problem

Mill superintendent Earl Craig's most troublesome problem so far has been the hard water from the company's wells. The water supplied from the wells in the valley near the Big Hole River contains many dissolved alkalies. As a result the flotation froths initially were wild

and very difficult to control. In addition it was not selective for the tungsten minerals. One attempt to solve the problem saw company engineers resort to the use of trisodium phosphate and calcium chloride additions to precipitate the soap consuming ions. This was followed with the addition of starch to disperse the minerals. This gave somewhat better results, but conditions still were not too satisfactory.

Test work conducted with water used on local irrigation projects in the vicinity, indicated that successful treatment of the ore could be carried out using this water source. Minerals Engineering then negotiated a contract with a local rancher for the use of a certain amount of his irrigation water.

Novel Tailing Disposal

Contrary to the practice at most mills, tailing from the Minerals Engineering mill goes through a series of settling steps to clarify the solids from the water. Nine earthen dikes, each operating in series, settle the solids from the pulp and ultimately provide a clear overflow which is discharged on the flat flood plain of the Big Hole River. The water then percolates into the ground. Here is one operation where miners can't be blamed by farmers or sportsmen for stream contamination. The ponds created by the first two dikes settle the sands; the remaining seven then clarify the overflow.

Rapid Tungsten Assay

For rapid assays, a colorimetric method has been developed to circumvent the long method (about six hours for a determination). The method once standardized for the Brown Lake ores is accurate, can be completed in 1½ hours, and simplifies quality control in the mill. Briefly, the method consists of a peroxide fusion and the mass is redissolved. A small addition of NaOH precipitates the iron and the solution is filtered. Stage additions of ferrous sulphate, sodium cyanate, stannous chloride, and hydrochloric acid follow, and the solution develops a lemon yellow color. Using a Fisher electrophotometer, the galvanometer readings which result are compared against a graph made from known standards.

STRIPPING WASTE with this recently acquired Eimco 105 loader has brought relief for one pressing problem. The presence of large boulders in the glacial morraine at the Brown's Lake deposit often proved too large to be handled by smaller units.

Minerals Engineering has recently purchased a Marcy 75 ball mill and is currently increasing milling capacity to 20,000 tons per month. It is anticipated that this increased milling capacity will be operating in the first quarter of 1955.

Blair Burwell is president of Minerals Engineering, R. G. Sullivan, Vice President, and W. B. Tobey is general manager of the Montana operation. Earl Craig is the mill superintendent, while R. N. Roby supervises the mining operation.

MILL SUPERINTENDENT Earl Craig (left) has charge of the concentrator, and W. B. Tobey (center) is general manager of Minerals Engineering's Montana project. R. E. Evans (right) filters iron prior to rapid colorimetric assay.

What's Ahead for Mercury?

The rapid rise in the price of mercury . . . the disappearance of 205,000 flasks from the U. S. market . . . the government's extreme secrecy over mystery metal . . . MINING WORLD interviewed authorities and visited mines to find the answers to this riddle.

What is the supply-price picture?

To find out what's ahead for mercury, MINING WORLD questioned some of the foremost mercury authorities. Here are our questions and their answers:

What is causing the present shortage and resulting high price for mercury?

1. Large purchases by the United States government, as well as those of foreign governments. It is the general belief that the bulk of these purchases are being made in connection with atomic energy power plants; more specifically, for using mercury vapor as the medium in heat exchangers. (However, this use has repeatedly been publicly denied by prominent employees of the AEC—Ed.)

2. Decreases in foreign production due to depletion of high-grade ore reserves.

3. Increasing private uses.

How long do you think the present price (above $320 a flask) will continue? The average answer in regard to this was that it would decline below $300 within several months, but would remain somewhere between $250 and $300 for some time.

Is the present price ($320 a flask and above) too high, so that users will find substitutes for this metal, causing a serious setback to the mercury mining industry? Some think that any selling price above $300 a flask would be too high. It is definitely known that mercury's use would be replaced in at least one large field if the above price continues for any length of time. Others believe that, because of the rapid changes in the use of mercury and its increasing applications, the continuation of this high price would cause no serious harm. For example, some years ago its largest use was for the amalgamation of gold; today this market is of small importance. Some of the most promising new applications appear to be: replacement of water in automobile radiators; as part of a process for making expendable mould patterns using the metal in its frozen state (Mercasting). Also, a use which has been known of for some years and which is rapidly gaining in importance is that of using mercury vapor in place of steam for the generation of power.

What is your opinion in regard to the government's mercury purchasing program announced July 6, 1954? This program calls for purchase by the General Services Administration of a maximum of 125,000 flasks of domestic mercury and 75,000 flasks of Mexican (at $225 a flask), or extends until December 31, 1957, whichever occurs first. Almost everyone agreed that this was a good floor price; that a mine operator should not make money, but only break even on a floor price; and that the majority of the producers would be able to do this. It is thought that very little if any mercury will be purchased under this present contract. To date none has. Since this money for government purchases has already been set aside, it is believed that a good possibility exists that this purchase program may be extended.

Do you look forward to seeing new, and large mining companies not previously engaged in mercury enter this field? It has been noted that large mining companies and financiers were quick to recognize the economics of uranium. Will this same thing, only on a much smaller scale, take place in mercury? The general belief was that the promising outlook for mercury would attract many new companies. It is known that some large mining companies, new to this field, are pres-

MERCURY awaiting shipment. At a price of $320 a flask the 135 flasks shown in the photo above are worth $43,200.

ently evaluating mercury deposits. However, since so little is known of this metal by most of these companies, it is thought that they will be slow in beginning operations. Some of the companies presently engaged in mercury mining are even having their expansion operations hampered by not being able to employ personnel familiar with this metal.

In summarizing the above, the consensus is that the mercury mining industry can look forward to productive economic conditions for some years to come. With such an outlook, here's what some major producers are doing.

Total Supply and Consumption of Mercury by Flasks in the United States from 1947 to July 1954

Year	Total Supply[1]	Consumption	Supply Compared to Consumption
1947	35,368	35,581	—213
1948	45,813	46,253	—440
1949	112,494	39,857	+72,637
1950	60,168	49,215	+10,953
1951	54,312	56,848	+ 2,536
1952	83,955	42,556	+41,399
1953	97,177	52,400	+44,777
1954[2]	52,195	13,200	+38,995
			Excess supply missing 205,572[3]

1. Production, plus imports, minus exports.
2. First six months.
3. Missing mercury thought to have been purchased by the United States Government for the Defense Minerals stockpile or the Atomic Energy Commission.

How are California mines expanding?

Sonoma Quicksilver Mines, Inc. is furnacing 120 tons of ore per day at its Mt. Jackson mine (includes the Great Eastern) near Guerneville, California. Mining of these ore bodies first began in 1876 and has continued intermittently. The property was acquired by Sonoma in 1940; since then operations have been continuous.

Present mining is being conducted at three parallel ore bodies served by a centrally located shaft. Distances between the ore zones decrease with depth, being separated by only 20 to 30 feet on lower mine levels. Average dimensions of the ore bodies are 12 to 40 feet in width, 50 to over 200 feet in length, and are of an undetermined depth.

The ore occurs as cinnabar (HgS) associated with opalite and sandstone, with a hanging wall of sandstone and a footwall of serpentine. Average grade of the ore being mined carries from seven to eight pounds of mercury per ton. Dip of the ore bodies decreases from 72° on the surface to 41° on lower levels.

Mining is by the shrinkage stoping method using chutes spaced on 25-foot centers. Levels are established at approximately every 100 feet. Lengths of the stopes are the lengths of the ore bodies. Current mining is on the 875 and the 975 levels. Haulage is with one-ton, side-dump cars trammed by hand the short distance to the shaft. From the shaft collar the ore is again hand-trammed a short distance to the furnace plant. This plant contains two kilns, one having a capacity of 90 tons and one 30 tons, per 24 hours.

The bright future outlook of mercury will result in a larger underground diamond drilling program at this mine; drilling lateral holes to explore for additional ore bodies. It also means that lower grade ore which was formerly by-passed can now be mined. Also, Sonoma recently began development of another mercury property northeast of Winnemucca, Nevada. Surface installations at this property are now under construction and open-pit mining operations have begun. Ore will be roasted in a 100-ton rotary kiln.

H. D. Tudor is president of Sonoma Quicksilver Mines, Inc.; E. R. Menary is secretary, and H. F. Larsen is superintendent at the Mt. Jackson mine.

Buckman Laboratories, Inc. began mining operations near Cloverdale, California in 1951. Work done during 1951 and 1952 consisted mostly of acquiring property, exploration, development, and construction. During 1953 open-pit mining was done at the Cloverdale mine under a lease.

The ore mined at the Cloverdale was from a series of alternately bedded brecciated chert and shale formations. Cinnabar is the ore-bearing mineral. The layers of shale represent only one-fourth of the ore body, but contain two-thirds of the mineralization. Mining was conducted by removing the sandstone overburden with Caterpillar tractors equipped with "U" blades; then using this same tractor to scrape the ore to a 6-inch grizzly mounted over a bin. A conveyor delivered the ore from this bin to two, single-deck vibrating screens connected in series. The first screen had 3/16-inch openings and the second 1/4-inch.

Undersize from these screens dropped into two separate 60-ton steel bins. Oversize (tailing) fell into a chute to a waste pile. A tractor was used periodically to push this pile over the edge of a near-by bank. The fines (mostly the shale formation) passing through the screens amounted to about one-fourth of the total product and contained two-thirds of the cinnabar. By this simple economical method of up-grading, a good-grade furnace feed was produced.

Two trucks were used to haul the ore from the loading bins to the furnace plant a distance of about five miles. During the five months that the plant was operated during 1953, approximately 56 flasks of mercury a month were produced. This same operation was carried out during five and one-half months of 1954, producing an average of about 100 flasks per month.

Average Mercury Prices and Resulting California and Total United States Production—1938 to 1953.

Year	Dollars per Flask (76 pounds)	Number of Flasks Produced	
		California	United States
1938	75.47	12,277	17,991
1939	103.94	11,127	18,633
1940	176.86	18,629	37,777
1941	185.02	25,714	44,921
1942	196.35	29,906	50,846
1943	195.21	33,812	51,929
1944	118.36	28,052	37,688
1945	134.89	21,199	30,763
1946	98.24	17,782	25,348
1947	83.74	17,165	23,244
1948	76.49	11,188	14,388
1949	79.46	4,493	9,930
1950	81.26	3,850	4,535
1951	210.13	4,282	7,293
1952	199.10	7,241	12,547
1953	193.03	9,290	14,337

Operations at the Cloverdale mine were discontinued in mid-October 1954 in order to transfer all mining operations to property owned by Buckman Laboratories, Inc., and operated under the name of Buckman Mines. This property consists of the former Culver-Baer, Black Bear, and Dewey mines, and an unnamed prospect. Exploration and development of this property was carried on simultaneously while mining was in progress at the Cloverdale. Larger scale production from Buckman Mines by both open-pit and underground began in December 1954.

The present mercury shortage is not affecting the mining plans of Buckman Laboratories. All of the mercury which they produce is used by their chemical plant in Memphis, Tennessee. Plans are to increase production to a point where they will be able to supply one-half of their chemical plant needs. This means that their production goal is approximately 2,000 flasks per year. Expansion to produce full requirements will only be made when it becomes impossible to secure mercury otherwise or if the price rises above $350 per flask.

The Abbott mine was discovered in 1860 and operated off and on until 1940 when it was purchased by International Metals Development. Operations by International continued until 1946 when poor existing economic conditions forced a shut-down. A few years later exploration and development work was done by Abbott Mines, Inc. On November 15, 1950 California Quicksilver Mines, Inc. was incorporated to take over operations from this company.

In the spring of 1951 a DMA (Defense Minerals Administration now replaced by DMEA) loan was granted and an underground exploration diamond drilling program began. An ore body was outlined by this drilling and a DMEA loan was received to aid in its development. The total exploration and development program amounted to $89,400. Of this, 75 percent was loaned by the government, with the mining company supplying the remaining 25 percent. Mining of this ore body is now in progress and the government loan is being repaid.

The chief ore minerals in order of importance are cinnabar (HgS) and metacinnabar (Hg,Fe,Zn,Se)S. These minerals occur in a host rock of opalite and serpentine breccia. The footwall is of serpentine and the hanging wall is shale. Dip of the vein varies from 35 to 40°. Ore occurs in shoots and chimneys, the average width of which is 7 to 10 feet. Average mercury content of the ore being mined is 15 pounds per ton.

Square set mining has been conducted on the 200, 300, 400, and 500 levels. Most of the production is now coming from the 200 level of the recently discovered ore body, and exploration is being carried out on the 300 level. This new ore body is located approximately 1,500 feet from the shaft. Broken ore in the stopes is scraped with double-drum slushers into raises, to chutes, to one-ton end-dump cars. Loaded cars are trammed to the shaft with a battery locomotive.

Discovery of the ore body, plus the increase in the price of mercury, has resulted in a $50,000 expansion program at the Abbott. Furnace capacity is presently 40 tons per day; another kiln, condensers, etc. are now being installed which will double this capacity. Part of the expansion program also includes a new stack for the two kilns.

C. O. Reed is manager at the Abbott mine.

What Texas mines are active?

The record price for mercury has resulted in a rush to the Terlingua district in the southern part of Brewster County and the southeastern part of Presidio County, Texas. This area, located 85 miles from Alpine, Texas, is also known as the Contrabanda district and ranks as one of the most important mercury centers in the United States. The largest mine in the district, the Chisos, with total production from 1895 to the present of about 165,000 flasks, ranks among the first five in mercury production in the United States, and among the first 10 in the world.

Some of the new operations in this district are those owned by J. T. Pausel, of Fort Worth, Texas, who owns the Rainbow mine and has purchased the controlling interest in the Waldron Quicksilver Properties, Inc. The Rainbow claims join the Waldron properties on the south and west, and the Chisos claims on the east and south. Ore is now being mined from the 600-foot level of the Rainbow and the furnace plant is being repaired.

The Buena Suerta mine in the Fresno district of Presidio County has been leased by R. N. Pulliam and associates. This group also plans on reopening a mine on the Mitchell-Gillett property, as well as doing exploration diamond drilling on several other acquired claims.

Adjacent to the Pullian and associates claims is a mine owned by Frank Duncan, which has been a large producer in past years. Work is now being done at this property in preparing to construct a furnace plant and commence production as soon as possible.

Universal Service Corporation of Houston, Texas has discovered mercury-bearing ore while drilling for oil on the Lewis Lewenthal ranch. It is reported that they are now exploring these showings by diamond drilling.

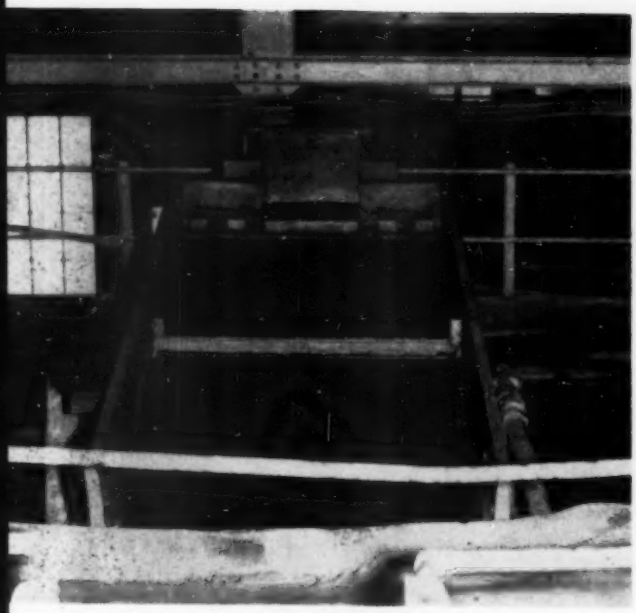
What Oregon mines are reopening?

Several mercury mines, most of them closed since World War II, are being reopened in central Oregon. One of the latest is that operated by Kennametal Inc. This mine is located in the Squaw Butte-Glass Butte area in Crook County, some 40 miles from Burns, Oregon. At present eight men are employed at this mine.

Kennametal is a newcomer to mercury. Previous to this their mining operations have been limited to tungsten in Nevada and California, and a tungsten refining plant at Port Coquitlam, British Columbia. Tungsten is used by them in their production of Kennametal for use in manufacturing wear-resistant parts and metal-cutting tools.

Another Oregon mercury mine from which production will soon be resumed is the old Horse Heaven in Jefferson County. Cordero Mining Company is now installing a furnace at this property.

Also, the Bonanza Oil & Mine Corporation is reopening its Bonanza mine at Sutherlin. Production will begin as soon as the furnace plant has been repaired.



NEW TYPE GRAVITY CONCENTRATION TABLE shown above has proven a cheap and efficient method of recovering gold-bearing pyrite. Note in the picture at left how the riffles are parallel to flow of pulp. The picture at right shows pulp flowing down the table. Capacity of the 3.5-foot-wide unit is 1,200 tons per 24 hours.

How New Table Recovers Fine Gold

Development and installation of a new type of gravity concentration table at the Rand Leases (Vogelstruisfontein) Gold Mining Company Limited has proven a cheap and efficient method of recovering gold-bearing pyrite in the grinding circuit. The new tables replace corduroy tables which had long been in use.

Rand Leases operates a gold mine and a gravity concentration–cyanide plant near Krugersdorp, Union of South Africa. Development of cyclonic classification by the metallurgical staff at Rand Leases was described in the January 1954 issue of MINING WORLD, pages 44 to 47.

Why New Table Was Developed

The inherent disadvantages of the corduroy table are well known: intermittent or batch operation; the rapid fall-off in efficiency with clogging and wear; the necessities of constant supervision and frequent washing; manual handling of valuable concentrates; and the relatively rapid wearing of the cloth. Accordingly, mill operators were always on the watch for a more suitable device. This was eventually found in the ideas of the late Donald McLean, who had for some time been engaged in developing a concentrating table, which operated continuously, dispensing with manual handling. Mr. McLean's ideas were taken up by M. J. Dennehy, then Reduction Officer at the Rand Leases mill, who was responsible for the installation and development of the plane table and who was assisted in this by S. K. de Kok (later transferred to the Anglo-Transvaal Consolidated Investment Co. Ltd.'s head-office) and R. V. Guthrie, now stationed at another mine of the Anglo-Transvaal group.

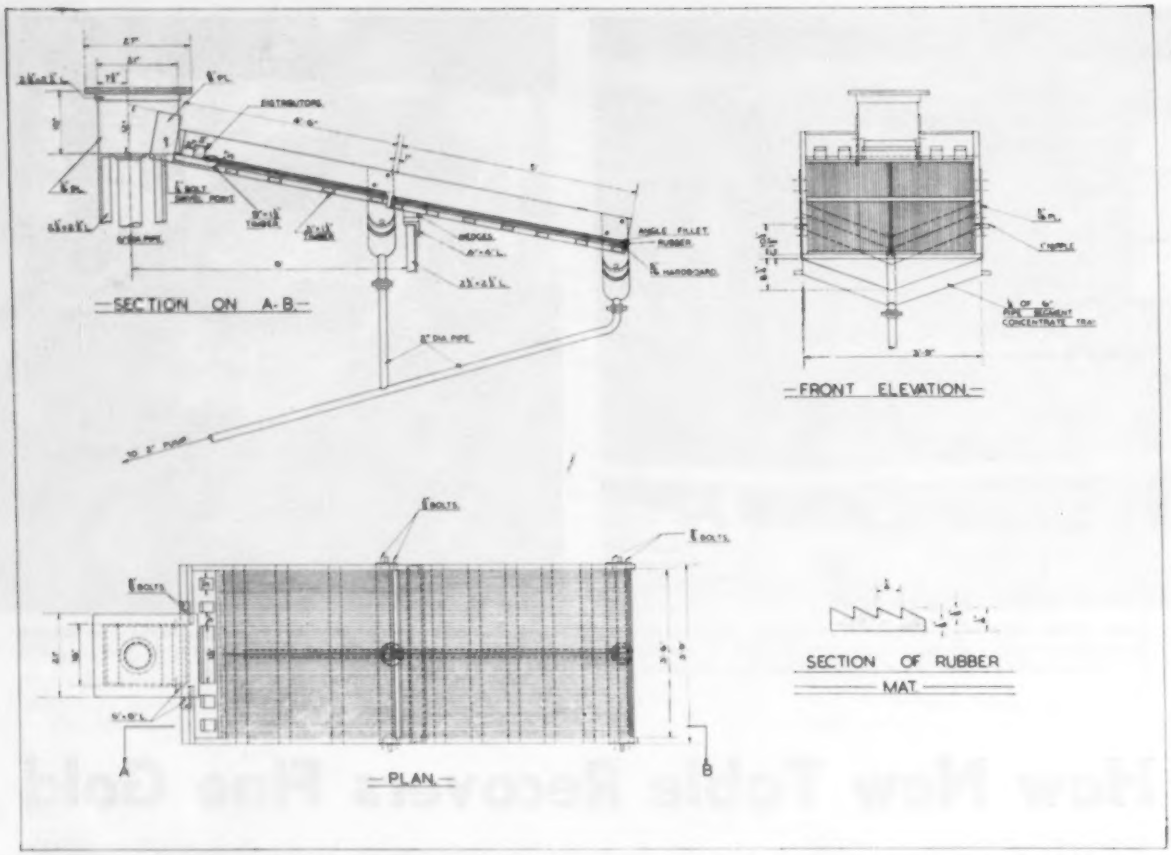
The operators and engineers concerned in the development and design of the plane table make no claim to the discovery of a new metallurgical or ore-dressing principle. Indeed, they point to the description of a similar device by Agricola in his *De Re Metallica*. Their part, they say, has been directed to the successful application of the principle to modern practice involving extensive mechanization and the handling of large tonnages.

Corduroy Tables Used Labor

Prior to the installation of the plane table in Rand Leases reduction plant, concentration of gold-bearing pyrites in the ore was by corduroy tables in the secondary grinding circuit only. The secondary grinding circuit comprised eleven 6½- by 20-foot pebble mills, operating in closed circuits, each of which incorporated a corduroy table with an effective area of 42 square feet set at a slope of 20°. The 11 tables handled the total overflow of the 11 mills. This represented about 19,800 tons of solids per 24 hours, the specific gravity of the pulp being 1.59 and the moisture content 41 percent. A shift crew of one European and six Natives was engaged in changing and washing the cloths at intervals of two hours through the shift-cycle of eight hours. About eight tons of concentrates per 24 hours were recovered by the 11 tables. These concentrates were transferred to the amalgamation section of the refinery, where the gold and osmiridium were recovered and and tailing returned to the mill circuit.

Double Deck With Rubber Mat

As now developed and in operation, the Rand Leases plane table is a



CONSTRUCTION DETAILS of the Rand Leases plane table are shown above. Note how the design provided for an upward flowing feed which is evenly spread over head of table by the distributor. A cross section of rubber mat is at lower right.

double-deck unit sloping at 20°. The double-deck is achieved by incorporating a downstep of 2¾ inches and a slot 1 inch wide between the two decks at a point 4.5 feet from the feed-box, the second and lower deck being 5 feet long from the slot. The effective width of the table is 3.5 feet. Accessory fittings include distributing blocks immediately following the feed-box, and two collecting launders—one under the slot and the other at the discharge end. These launders are connected with 2-inch pipes for conducting the concentrates to the centrifugal pumps, as shown in the accompanying illustration. The deck-base can be fabricated from any suitable material: hardwood, steel plate, or concrete.

Flow Parallel To Riffles

The base is covered by rubber matting with the riffles parallel to the flow. The best shape for the riffle groove to achieve maximum efficiency has not yet been finally determined. Investigation is being continued. So far, good results have been obtained from the angular saw-tooth pattern. Eddy current or turbulence are minimized by fitting the rubber mat with the saw-tooth outwards from the center-line of the deck. The riffle-spacing is ¾ inch and the groove depth ¾ inch.

Comparison of Concentration Results with Corduroy and Plane Tables at Rand Leases Gold Mill Union of South Africa

Item	Secondary Circuit Eleven Corduroy Tables[1]	Secondary Circuit Ten Plane Tables[2]	Concentrate Regrind One Plane Table[2]
SIZE ANALYSIS PERCENT			
Plus-48-mesh	14.8%	14.8%	1.9%
Plus-100 mesh	38.9	38.9	20.3
Plus-200 mesh	22.2	22.2	43.7
Minus-200-mesh	24.1	24.1	34.1
TONS PER 24 HOURS	19,800[3]	20,000[3]	1,200[4]
CONCENTRATES			
Tons per 24 hours	8	150	8 to 10
Percent FeS_2	—	15	44

1. Each with an area of 42 square feet.
2. Two-deck, each with an area of 33.25 square feet.
3. Approximately 5 percent FeS_2.
4. Total feed to regrind table equals the total concentrates from secondary tables plus tailings from amalgamation section of refinery, plus circulating load. Contains 22 percent FeS_2.

Briefly, stratification of the particles in the pulp as it flows down the table is effected by gravity and size. The lowest particles constitute the concentrate and consist of pyrite and gold, admixed with the larger particles of gangue. The settlement of the particles makes the fluid, or pulp, more viscous (slower moving) with depth. This, combined with the relative effect of gravity on particle velocity in the plane of travel, sets up velocity differentials through the vertical plane or its projection at right angles to the direction of flow. This enables the heavy minerals to drop into the launders, while the lighter gangue particles are carried over the slot and over the launder at the discharge end.

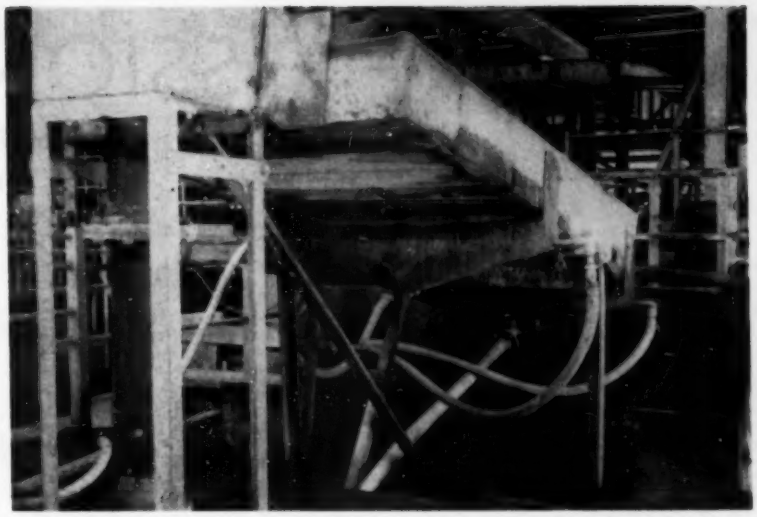
Tests of the plane table demonstrated that for any one unit, the two important variables are the dilution of the pulp and the slope of the deck. It was shown that at any given specific gravity of the pulp—within practical limits, of course—the concentrate ton-

nage is inversely proportional to the slope or that it increases as the slope is reduced. Also that for any given slope—again within practical limits—the concentrate tonnage is directly proportional to the specific gravity of the pulp or increases as the specific gravity is raised. These tests were conducted with the specific gravity range from 1.62 to about 1.69, with the slopes at 15, 18, 21 and 22°. Concentrate tonnage was from about three to nearly nine tons in 24 hours.

Tables In Secondary Circuit

The overall superiority of the plane table over the corduroy counterpart was clearly made evident by these tests. Corduroy tables have accordingly been replaced by the plane tables in the Rand Leases mill, in which the layout of the secondary circuit has been modified. Today this consists of 10 pebble mills operating in closed circuits, each of which incorporates a plane table. The 10 tables handle the total overflows of the mills (including the circulating loads) at the rate of about 20,000 tons of solids in 24 hours, the specific gravity and moisture content of the pulp being 1.66 and 37 percent, respectively.

The concentrates from the 10 tables, about 150 tons per 24 hours, are pumped to the regrind mill circuit, which was formed from one of the 11 secondary pebble mills previously operating with corduroy tables in their circuits. The regrind mill overflow constitutes the feed to the final plane table: the specific gravity and moisture of the pulp being 1.82 and 30 percent, respectively, and the tonnage about 1,220 per 24 hours. The tonnage, of course, includes the circulating load. The concentrate from the regrind plane table, from 8 to 10 tons approximately per 24 hours, is pumped to the amalgamation section of the refinery where the gold and osmiridium are recovered and the tailing returned to the regrind circuit.

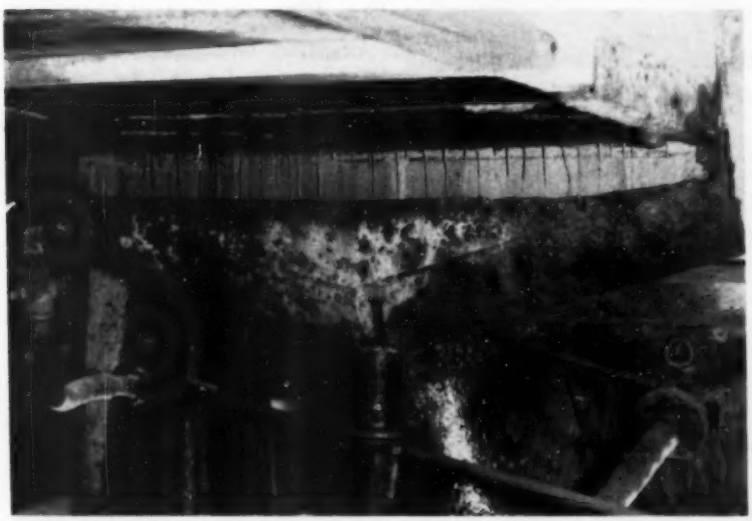


CONCENTRATE IS COLLECTED at two places on the double-deck plane table at the Rand Leases gold mill in the Union of South Africa. This picture shows underside of one of the tables with launders and concentrate lines.

Plane Table Advantages

The advantages claimed for the plane table in the light of the Rand Leases application and results can be summarized as follows:

1. The initial cost is low.
2. Fabrication in mine workshops can be easily done.
3. Wear of the exposed parts is negligible so operational costs are low.
4. Maintenance is confined to the occasional replacement of the rubber mats and distributing blocks.
5. The manual handling of concentrates is estimated; operation is continuous; supervision is limited to the shiftman's normal duties and attention; only the occasional sweep of a wire-brush is required for the removal of iron particles from the riffles.
6. The opportunities for theft of concentrates are reduced to safe limits; if required, wire screening can be readily fitted over the tables.
7. The plane table can be applied without difficulty to existing grinding circuits.
8. The control of pulp density presents no difficulties.
9. Greater efficiency is indicated by the following results: with the plane tables, the recovery of gold in the grinding circuit constituted 43.75 percent of the total plant recovery, according to a recent return, compared with the corresponding figure of 38.02 percent during the use of the corduroy tables in the secondary grinding circuit.

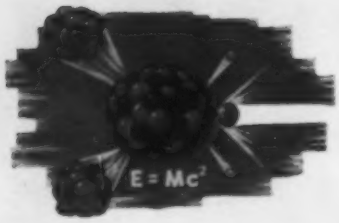


FULL WIDTH LAUNDER underneath the center of the plane table collects concentrate from the upper section of rubber matting. Concentrate drops through the one-inch-wide slot while the lighter slime and sand fraction cascades to lower section.

Cooperation Appreciated

The Rand Leases mill is now experimenting with a plane table having three decks and three collecting launders. The existing units, as mentioned earlier, are double-deck tables with two collecting launders. Test and operational data are not yet available in respect of the three-deck table.

The thanks of MINING WORLD and WORLD MINING are due to the head-office staff of Anglo-Transvaal Consolidated Investment Co., Ltd. and the reduction officer and staff of Rand Leases mine for extending to their Johannesburg correspondent the facilities to compile this article. The reduction officer, T. Zadkin, recently delivered an address to the chemical, Metallurgical and Mining Society of South Africa on the Rand Leases plane table. MINING WORLD's and WORLD MINING's thanks are also due to this Society for their part in making publication of the article possible.



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

Philippine Islands Has Commercial Uranium

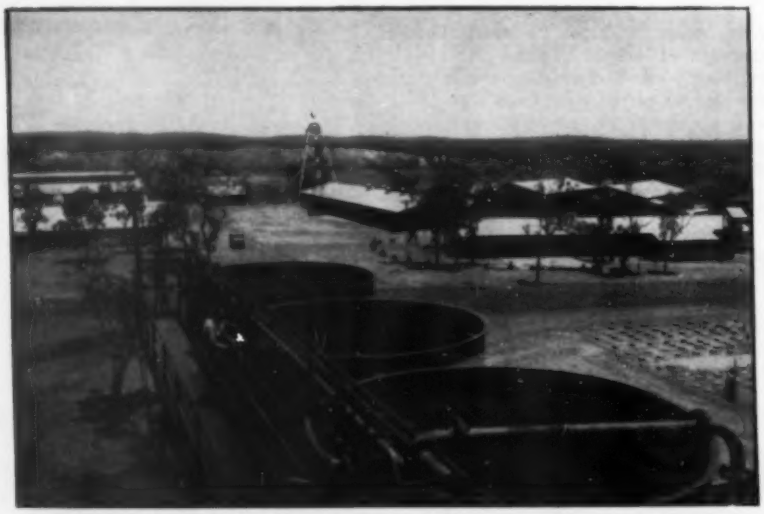
Uranium of commercial value has been discovered on the property of the Philippine Iron Mines, Inc. at Larap, Camarines Norte, Philippine Islands. Extent of the deposit has not yet been determined, but development work is being undertaken to evaluate its importance.

The discovery was made by George T. Scholey, consulting engineer for A. Soriano y Cia., and J. Frost, chief geologist of Philippine Iron Mines, in the course of a radiometric survey of the property. The first samples were sent by air to the United States and assayed 0.20 percent U_3O_8 and 0.11 percent U_3O_8. Samples were cut over a width of three feet.

This area had been diamond drilled several years ago to determine the extent and nature of a vein which carried copper minerals and chalcopyrite. The cores of one hole had been stored and were immediately checked with a Geiger counter and good "kicks" were noted in several places. Of interest, the hottest spot also showed a considerable amount of chalcopyrite and molybdenite.

Samples of these cores were also rushed to the United States and these gave results of 0.20 percent U_3O_8 at a depth of 200 feet to 207 feet from the collar, 0.20 percent U_3O_8 from 398 to 404 feet, and 0.10 percent from 404 to 420 feet. Aside from the above results, a large section in the diamond drill hole shows an average of around 0.05 percent. A diamond drilling program has been laid out to obtain more data on the area.

There have been a number of reports before about the discovery of uranium in the Philippines which upon further checking have proven false. Therefore, before announcing the discovery and assays to MINING WORLD, complete spectrographic, chemical, and radiometric analyses were made to definitely confirm the presence of uranium.



Rum Jungle Uranium Mill and White's Mine

On September 17, 1954 this uranium mill at Rum Jungle, Northern Territory, Australia was opened as the first commercial uranium plant in Australia. The mill was designed, built, and will be operated by the Territory Enterprises Pty. Ltd., a wholly owned subsidiary of the Consolidated Zinc Pty. Ltd., which was selected by the Australian Commonwealth for these purposes because of the outstanding record of Consolidated Zinc in both mining and metallurgy. Uranium mineralization was discovered in the area in 1949 by Jack White, a veteran prospector. The Australian Bureau of Mineral Resources was interested and started geological mapping and sampling in 1950. In the same year two 100-foot-deep shafts found high-grade ore which was part of a large ore body. White's Shaft (shown above), named, of course, for the prospector, has since been sunk to a depth of 500 feet. In 1950 a second ore body was discovered by and named for D. F. Dyson, a geophysicist for the Bureau of Mineral Resources. This mine has been an open pit from the start. The White's mine has been converted from underground to open-pit mining because of the difficulty and cost of stopping the heavy, soft, and wet ore. In both open pits overburden is stripped and the soft ore loaded into trucks with a bulldozer and loading ramp. The new mill will be able to treat the near surface oxidized ores (torbernite, autunite and oxide copper minerals) as well as the deeper primary ores in which pitchblende occurs in a disseminated sulphide copper ore (bornite, pyrite, chalcopyrite, and chalcocite). The main difference is that the sulphide copper minerals will be recovered by flotation and the primary uranium minerals oxidized with MnO_2 before leaching. For both ores the minerals will be liberated by closed circuit fine grinding and the uranium-bearing pulp agitated and leached with dilute sulphuric acid in the Pachuca tanks shown in the photograph. The uranium minerals, now in solution, are filtered from the sand and slime and a uranium precipitate obtained. This is stockpiled, awaiting the start of the Port Pirie, South Australia refinery where solvent extraction will be used.

Western National Will Explore with Helicopter

The Western National Company, Ltd. has purchased two helicopters, equipped each with about $6,000 worth of geophysical instruments, and will use them to explore the Colorado Plateau area for uranium.

One of the planes will be based at Monticello, Utah for the use of Grover C. Moore, consulting geologist and mining engineer for the company. The other will be based in the Grand Junction, Colorado area.

Western National has purchased an option on 15 claims in the vicinity of Happy Jack mine. The claims are in the Henry Mountains and are owned by O. C. Williams of Phoenix, Arizona and Daly Anderson of Mesa, Arizona. The ore occurs in the Shinarump conglomerate, and the beddings have a vertical thickness of approximately 40 feet, showing a mining width of about 300 feet.

Utah Test Case Upholds Legality of Circular 7

A case said to be the first to test the validity of AEC Circular 7 and Public Law 585, which revised the procedure for simultaneous extraction of mineral ores and oil and gas, was concluded recently at Monticello, Utah. The Court found the new provision to be the law governing the filing of claims on lands covered by prior lease under the mineral leasing laws.

Under dispute were three mining claims in Kane Canyon, Utah, known as the Atomic King property. Jack Nielson and George Palmer of Monticello had filed claims under location notices made under the mining law in effect the latter part of February. A group of Dove Creek, Colorado men had made claim to the same property under the provision of Circular 7, which was posted early in February. The court found that Nielson and Palmer had located their claims under mining laws which did not give them such claim and awarded the decision to Frank Eggers, Lee Snyder, Frank Snyder, Thomas Jackson, and Everett Robinett.

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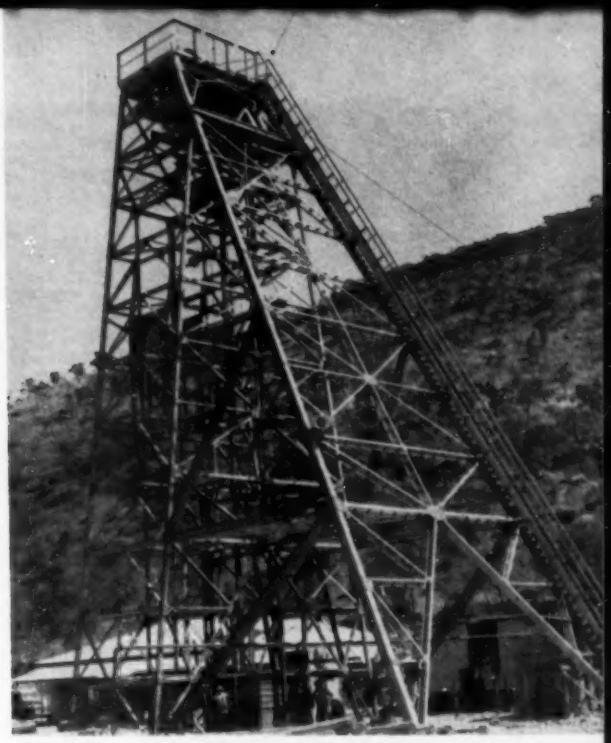
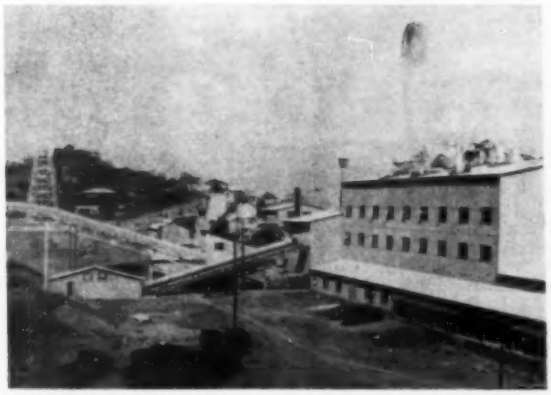
J-M Opens Asbestos Mines in Rhodesia



HEADFRAME of one of the two asbestos mines served by the central mill. Each mine's shaft is approximately 550 feet deep. Both are highly mechanized.



CENTRAL MILL which has an annual capacity of 20,000 tons of asbestos fibre. The fibre is of the chrysotile type and is suitable for the manufacture of asbestos-cement products.

JOHNS-MANVILLE put two asbestos mines into commercial production at Mashaba, Southern Rhodesia on November 25, 1954, with the official opening of this new central mill.

AERIAL VIEW of the Mashaba plant, and staff and native housing units. Mining and milling is being carried on by Rhodesian Asbestos Limited under the direction of Johns-Manville.

15-TON TRUCKS undergoing maintenance. These trucks are used to haul ore from one of the mines to the mill, a distance of four miles. The other mine is located adjacent to the mill.

How Television Sees 1,200 Feet Down Calumet & Hecla's Centennial Shaft

Television, which is playing such an important part in the entertainment world, is of growing importance in the mining world. It is the closed circuit type often termed industrial television, or ITV. It is a private system with one or more cameras linked to one or more receivers by a coaxial cable system.

ITV has many advantages: a continuous picture is instantaneously transmitted long distances so that an observer can see what is happening far away, can check an operation that is unsafe to observe closely, or one that is too inaccessible for constant surveillance.

ITV has gone underground, too, and its applications have only been started in the mining industry. One of the first underground installations is in the Centennial mine shaft of the Calumet Division, Calumet & Hecla, Inc.,

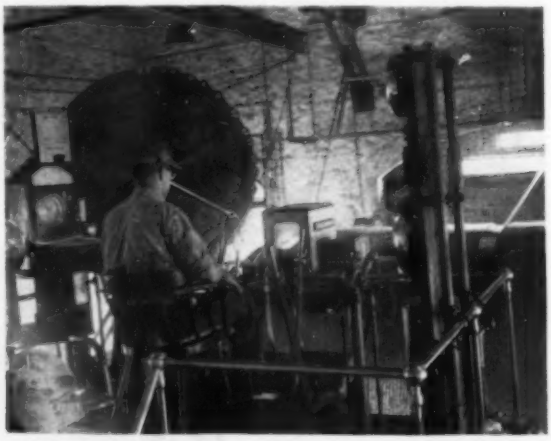
TELEVISION CAMERA 1,200 feet down the curved and inclined Centennial shaft is checked by Gordon Kingstrom, mine captain. Camera is focused on the horizontal sheave to enable engineer to see if rope is traveling on sheave and not damaging shaft timber.

Calumet, Michigan, where television cameras are now constantly focused on two horizontal sheaves, located midway between the rails over 1,200 feet down the shaft.

There is a long, gradual curve in the shaft at this point, and the sheaves are necessary to prevent the skip ropes from slapping against the rails and timbers, greatly reducing the period the ropes can safely be used.

Before the cameras were installed, a watchman had to stay in the shaft to warn the hoisting engineer if the ropes came off the sheaves. Now, an image of the sheaves is relayed to a split-image monitor located on top of the hoist in front of the engineer. He is able to watch the ropes and sheaves himself, increasing efficiency and safety, as well as saving valuable time. If a rope comes off a sheave, the engineer can immediately pull the skip back until the rope returns to its place.

The curved shaft, a rarity in the mining industry, is a result of the restricted property lines of the mine's original owner, the Centennial Mining Company. The curve was necessary so that the shaft would be located in the center of the company's ore body. This equalized the distances ore had to be transported from either side of the shaft,



TELEVISION RECEIVER on top of the Centennial mine hoist shows the engineer whether the rope is running on the sheave or not. If rope comes off sheave, the engineer can immediately stop the skip; move it back until it runs on sheave so shaft won't be damaged.

an important item in the days before underground operations were mechanized.

Now, through the new magic of television, this curve presents no particular problem. Throughout industry, TV has become the answer to production problems. It seems destined to play an even greater role in the years ahead.

"Moly" In New Welding Rods

The American Manganese Steel Company has developed an Amsco V-Mang welding rod containing molybdenum. The rods are used for the refacing and building up of manganese steel wearing parts, such as crusher liners and scraper blades.

As a weld deposit of austenitic manganese steel cools slowly from red heat, it becomes hard and brittle, unless some alloying agent or "preservative" is present. Until recently, nickel was thought to be the best alloying ingredient because it maintained toughness of the deposit during the slow cool. However, yield strength (an important factor in impact resistance), is lowered during the cooling, and nickel is not effective in raising it.

In searching for other alloying ingredients, Amsco lab technicians found that molybdenum not only preserves toughness in the slowly cooling deposit, but raises the yield strength to give superior impact resistance.

WHERE TO FIND URANIUM in the northwest draws large crowd to uranium session at 60th annual convention of the Northwest Mining Association. Keen interest of the crowd is shown by many miners taking detailed notes on occurrences.

Uranium Holds Lead Miners' Attention

The uranium rush is on in northwestern Washington now—and first shipments from the state will soon be made! These were the reports of speakers, prospectors, and miners attending the 60th Annual Convention of the Northwest Mining Association in Spokane, Washington on December 3 and 4, 1954.

And record numbers of northwestern lead-zinc miners who had gone to the uranium mining districts of the Colorado Plateau during the year, returned to Spokane for the convention. All in all, uranium dominated the meetings and was the topic of nearly every conversation wherever miners got together.

Everyone was optimistic! The companies that had engineers and geologists on the Plateau knew they were making the right move in diversifying their interests, while the companies who had not become interested in the Plateau felt they were in on the ground floor and would soon be staking claims in their own backyards—Ferry and Stevens counties.

Where to Look for Uranium

News of "Uranium in the Northwest" was presented by Frank Armstrong, United States Geological Survey geologist stationed in Spokane. He reported that more than 100 uranium claims had recently been staked in the Sherman Pass area near Republic, Washington. Also that pitchblende has been found in veins at the Garm-Lamoreaux mine northwest of North Fork, Idaho, and autunite and metatorbenite on the Surprise claims three miles to the east. Exploration projects financed by private operators and the DMEA should determine grade and extent of this mineralization.

The uranium discovery that has attracted greatest interest to date in the northwest is that of Midnite Mines on the Spokane Indian Reservation about 60 miles northwest of Spokane near the town of Wellpinit. Autunite has been found in shears and fractures in argillite (hornblende mica schist) adjacent to a granite contact. Several radioactive outcrops have been found along a strike length of a mile. Several railroad car loads of ore have been mined from the discovery outcrop and will be shipped to Vitro Uranium Company at Salt Lake City, Utah under a "fringe contract" with the United States Atomic Energy Commission. AEC will also diamond drill the discovery.

Two areas in the northwest have the correct geologic setting for uranium occurrences, in Armstrong's opinion. One is the northern Cascade Mountain area in Washington. There, because of the rugged terrain, foot prospecting would have to be done. Both copper- and molybdenum-bearing veins are known and both of these metals are uranium associates in other

ENTERTAINMENT for the ladies was arranged by Mrs. Dana Smith, chairman WAAIME; Mrs. Randolph Green, general chairman; Mrs. A. E. Weissenborn, entertainment; Mrs. Walter Melrose; Mrs. John Bowsher; and Mrs. John Armstrong, favors.

MINING TAXES were discussed by Eustace LeMaster who spoke on "Philosophy of Mineral Taxes"; Bernard Ramstedt, "Special Grants From Government"; J. R. Randall, "Percentage Depletion"; and L. Gordon Lee, "Exploration and Development."

parts of the world. The second area is central-eastern Montana where the sediments are similar to those of the Colorado Plateau; they contain similar organic materials. Also the same types and forms of igneous intrusives are found as on the Plateau. However, despite the geologic similarities there has been no uranium found to date.

Development of the Galena Unit

Lead-zinc-silver mining in the Coeur d'Alenes will long continue to be the most important mining in the northwest. The newest deep mine in the northwest is this type and it will mean other new mines and long-time production.

This new deep mine is the Galena Unit of the American Smelting and Refining Company in Lake Gulch near Wallace, Idaho. J. E. Berg, general manager, Northwestern Mining Department, ASARCO, prepared a special paper on this project for the meeting. So great was the interest in this paper that the largest crowd of the convention heard Manning W. Cox, ASARCO geologist read the paper.

The Galena Unit is a joint venture of the American Smelting and Refining Company and Day Mines, Inc. After making careful geologic studies which indicated the possibility of finding base metal mineralization in blind ore shoots as much as 4,000 feet below the surface, a plan was drawn to prospect for such shoots by extending the Galena shaft to a depth of 3,000 feet. First surface work was started early in January 1947. It was not until August of 1950 that the shaft had been sunk and crosscutting and diamond drilling disclosed several lead-bearing veins. These veins were developed from the 3,000 to the 2,400 foot levels. In February 1953 an important silver-bearing siderite vein was found in an easterly crosscut. This has been developed from the 3,400- to 2,400-foot levels. Following these ore discoveries, the Zanetti Brothers' mill near the collar of the shaft was purchased and enlarged to a 350-ton-per-day capacity. Mining on a large scale is expected to start shortly. Systematic extraction by cut and fill stoping using deslimed mill tailing for fill will be used. It is believed that this will minimize possibilities of rock bursts.

It is of interest to note that to the end of October 1954 98,000 tons of development muck had been milled, from which average recovery was 14.2 ounces silver, 1.98 percent lead, and 0.61 percent copper per ton.

Public Relations and Mining

Miles P. Romney, manager, Utah Mining Association, Salt Lake City, Utah who has helped develop and supervise a public relation program for the mining industry in Utah, told of the reason for such and the success of the Utah projects. He said "Public relations are vital to mining operations for the reason that the lack of public understanding of the problems of mining conditions has seriously threatened the mining cycle. These adverse conditions have developed because of the

LEAD PRODUCERS shown in left photograph are R. R. McNaughton, COMINCO, Trail British Columbia, and J. B. Haffner, Bunker Hill and Sullivan, Kellogg, Idaho. At right the outlook for zinc is discussed by B. Ingvolstad, Bunker Hill and Sullivan; John George, Wallace mine operator; and P. C. Fedderson, vice president and general manager of Bunker Hill.

attitude environment in which the mining industry now finds itself. Attitude environment is the reflection of the basic concept the public has of the mining industry's position in the over-all economy." Education of the public has been one of the Utah keys to a better environment. This starts in the grade schools where special mineral kits have been prepared to interest students in the state's minerals.

Sunshine Practices

The technical sessions were arranged by the Columbia Section of the AIME and featured two speakers from the Sunshine Mining Company, Kellogg, Idaho. Robert N. Breckenridge, mine foreman, outlined recent drilling practices. He reported that lighter machines, alloy steel drill rods, carbide insert bits, and smaller diameter holes have reduced both exploration and mining costs. He pointed out that, "Many advantages accrue to the operator in adopting the 1⅝-inch insert bit and ⅞-inch hexagonal alloy steel . . . that miners are of necessity limited to 28.4 percent as much powder per round with the smaller hole compared with a 1⅝-inch hole."

Paul H. Lloyd, assistant mill superintendent, outlined how changes and modernization in milling practices and equipment had made it possible to recover higher grade concentrates more suitable for smelting schedules. Increased dollar return per ton of ore quite naturally was the result. Today milling practice is directed toward: (1) high-grade copper-silver-antimony concentrate low in lead from which company recovers electrolytic antimony with copper-silver residue for shipment to a copper smelter; (2) lead concentrate with low arsenic; (3) increased silver recovery in a scavenger silver-bearing concentrate for copper smelter sale; and (4) rejection of the bulk of the deleterious arsenic in mill tailing.

Canadians Participate

It was a noteworthy feature of the convention that the registration of Canadian operators was probably the largest to date. It is a splendid thing that the technology of mining and free exchange of ideas and methods recognizes no boundaries. Appropriate, too, was the main speaker at the joint AIME-CIMM luncheon who was a Canadian—The Hon. Dr. G. C. Monture, Chief Mineral Resources Section, Department of Mines and Technical Surveys, Ottawa, Canada.

ASSOCIATION OFFICERS who have done so much for the mining industry in 1954 were reelected for 1955. From left to right they are: Karl W Jasper, president; P. E. Oscarson and Robert E. Sorenson, vice presidents; and R. J. Towne, secretary.

GEOLOGY KNOWS NO BORDER as leading United States and Canadian geologists talk uranium From left to right: E. A. Youngberg and L. D. Jarrard, AEC; Dr. G. C. Monture, Canadian Dept. of Mines and Technical Surveys; A. E. Weissenborn, USGS.

WASHINGTON ZINC PRODUCERS meet at the Northwest Convention. On the left are Robert Blake and P. A. Lewis, ASARCO's Van Stone Unit, while to the right are W. L. Ziegler, L. M. Kinney, and L. G. Billings from Pend Oreille Mines.

TUNGSTEN, OIL, AND COAL resources of the northwest were discussed by Neil Roby (second from left), Minerals Engineering Company; R. M. Hardy, Sunshine Mining Company; and Dr. J. D. Forrester, University of Idaho, E. C. Stephens (far left), Anaconda Copper Mining Company, was chairman of the natural resources section.

COMMENTS——from industry leaders——

Charles Steen

Advises Grubstaking Prospectors

Charles Steen, president of Utex Exploration Company, had a lot to say about prospecting at the Canadian Institute of Mining and Metallurgy meeting in Vancouver, British Columbia in mid November. To an audience of the world's best prospectors who are almost daily finding unknown deposits all over the great northland Steen said, "The chances of hitting paydirt are better in backing a uranium prospector than riding a tip on the stock market . . . People who speculate on the stock market should get together and pool their cash. They should grubstake a prospector and get a better run for their money."

In describing his own prospecting and its successful outcome he said, "People call it luck, and I guess it was when you think of the poverty and hardships and humiliations we left behind us when we found ore."

James Boyd

Says Geophysics Gives Indispensable Aid

"Twenty-five years of practicing geophysics and geology, or being on the fringes of it, have long since convinced me that the Good Lord did not provide an easy way to find oil and metals," was the report of Dr. James Boyd, exploration manager of Kennecott Copper Corporation, on November 18, 1954 to the Society of Exploration geophysicists. He added, "No equipment will be devised capable of finding unerringly our economic deposits for us; we must orient ourselves towards solving the most fundamental and complex of geological problems. Geophysics gives absolutely indispensable aid to all of us who are investigators in this aspect of earth science.

"To begin with, being optimistic about mineral resources does not imply that there is not hard work ahead for the scientist or engineer. On the contrary, there is more and more need for the trained technologist, his skills and his brains. I am saying that raw materials are everywhere available in the world around us; it is up to us, using our technological and scientific abilities, to utilize them economically and effectively.

"If I can sum up my conclusion in a few words, I should say that the place of geophysics in an expanding economy is intimately related to the development of knowledge derived from fundamental research—and I mean by this, truly fundamental research, not a rehashing of the same old ideas in refinements of instrumentation as applied to the solution of simpler geological problems."

R. D. Leisk

Puts the Admiral on Course

R. D. Leisk, vice president and general manager of the Sunshine Mining Company, Kellogg, Idaho, recently answered an anti-silver talk made by Rear Admiral Donald J. Ramsey at the convention of the Mirror Manufacturers' Association on October 27th in Asheville, North Carolina.

Mr. Leisk has given MINING WORLD permission to print his comments concerning the Admiral's talk so that the true facts concerning silver will be readily available for all. Here are the comments:

"The 'Report on the Silver Crisis' by Rear Admiral Ramsey is but another of the many salvos he has fired over the past several years and, as usual, the gunnery is poor, and the shots go wide of the mark.

"Admiral Ramsey is the paid agent of the Silver Users Association which, in turn, is a well-financed vehicle maintained in our national capitol by silverware manufacturers and certain other users of silver for the purpose of procuring repeal of the Silver Purchase Act, and thereby making domestic silver production vulnerable to the type of price manipulation that drove the price of silver to record lows in the 1920's. Manufacturers of silverware and jewelry receive prices in the range of several dollars per ounce for silver in manufactured form, but would like to increase their already large mark-up by buying silver below the present market.

"In his present paper, the retired Rear Admiral seems obviously to be far out at sea in dense fog without benefit of compass, navigator, or rudder. In trying to go in opposite directions at the same time, he, of course, goes nowhere. The present effort, like prior ones, contains so many errors that it defies logical analysis and can only be regarded as a masterpiece of confusion. A few examples should suffice:

"The statement is made that the Silver Purchase Act of 1934 established the monetary value of silver at $1.29 per ounce. The fact is that the monetary value of the silver content of the United States dollar was established by the First Coinage Act signed by President George Washington on April 2, 1792. This act stipulated that 371.25 grains of pure silver, or 0.773475 troy ounces, should constitute the silver dollar of the United States of America. The standard thus established has never been changed.

"The Admiral makes the following astounding statement about silver: 'Its use as money is confusing. In subsidiary coinage—that is, half-dollars, quarters and dimes—its use is quite proper. On the other hand, its use as backing for paper money is unsound, inflationary, and a fraud on the people.' This alleged 'fraud' may be explored by looking at a one-dollar bill, which appropriately enough bears the likeness of George Washington. It will be noted that the following is printed on the face of the bill: 'This certifies that there is on deposit in the Treasury of the United States of America One Dollar in silver payable to the bearer on demand.' Everyone except possibly the Admiral understands from this that one silver dollar is on deposit in the United States Treasury for each dollar bill in circulation. Everyone likewise knows that such a silver dollar may be exchanged for two silver half-dollars, four silver quarters, or 10 silver dimes. Yet the Admiral proclaims in effect that to have a silver dollar in your pocket is a 'fraud on the people,' but that to have the equivalent in silver half-dollars, quarters and dimes is 'quite proper.'

"The Admiral attempts to show that the purchase of newly mined domestic silver for monetary purposes is of little economic importance to two of the leading silver producers of this country. He fails to show the United States Treasury side of the picture. The simple fact is that expanding population and economic growth of the country require substantial annual additions to the amount of subsidiary coinage and small denomination paper currency in circulation. This need is being met under existing laws in the following manner.

"For each 1,000,000 ounces of newly mined domestic silver tendered to the United States Treasury, 700,000 ounces are paid for by converting it into money at $1.29 per ounce. The remaining 300,000 ounces usually referred to as 'seigniorage' are received by the treasury, without any payment whatsoever, as a sort of commission on the deal.

"This 300,000 ounces is normally minted into half-dollars, quarters, and dimes at an average value of $1.3824 per ounce of contained silver, or roughly $415,000. With domestic production running about 40,000,000 ounces per year, it will be seen that the treasury has an income from minting 'seigniorage' of about $16,000,000 per annum.

"It seems quite apparent that the Admiral is confused, but no more so than his listeners must have been when he delivered his paper."

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United States

Personalities in the News

Two top-level staff appointments have been announced by Climax Molybdenum Company, Climax, Colorado. **FRANK COOLBAUGH** (left), vice president, western operations, has been elected president and director of Climax Uranium Company, replacing **JOHN H. WHITE, JR.**, who has resigned. **JOHN J. CURZON** (right), who was recently named deputy director of the U.S. Atomic Energy Commission's mining division at Grand Junction, Colorado (see MINING WORLD, November 1954, page 59), has resigned that post to become manager of exploration for the Climax Molybdenum Company. He assumed this new post December 1, succeeding the late **C. J. (JACK) ABRAMS**, veteran executive of the company and widely known mining figure who passed away late in October.

Elmer V. (Mike) Reinhardt, former geologist with uranium branch of the Hunt Oil Company, has set up a consultation service in Grand Junction, Colorado. The firm will give mine examination and appraisal service and do mine management consultation work. Mr. Reinhardt has had geological experience with the U.S. Geological Survey, the U. S. Atomic Energy Commission, and with private industry in the Coeur d'Alene, Idaho area, the Colorado Plateau, and in South America.

Achievement awards to leaders in the mineral industry field have been awarded by the American Institute of Mining and Metallurgical Engineers, Inc. **Edwin Letts Oliver**, president of Oliver United Filters, Inc., was presented the James Douglas Gold Medal for his invention of the Oliver continuous filter. **Edward Wilson Davis**, professor at the University of Minnesota, received the Robert H. Richards Award for his technical contributions in the utilization of taconite as a source of iron ore. **R. E. Thurmond**, Pima Mining Company, and **W. E. Heinrichs, Jr.**, United Geophysical Company, both received the Robert Peel Award, presented to younger members of the AIME for outstanding papers, for their "Geophysical Discovery and Development of the Pima Mine, Pima County, Arizona." **E. D. Gardner**, Washington, D.C. received the Daniel C. Jackling award for significant contributions to technical progress in the fields of mining, geology, and geophysics.

R. R. Williams, Pueblo, Colorado, has been named manager of the mining department for Colorado Fuel & Iron Company. He has been with CF&I since 1925.

M. N. Shaw, former manager of the Salt Lake Tungsten Company, has been named manager of a new tungsten operation in Tooele County, Utah by Consolidated Uranium Company. The firm has leased 12 tungsten mining claims in the Clifton Mining District from Timco Uranium and Stardust Mines, Inc.

Aluminum Company of America has announced three promotions. **C. L. Kessler** has been appointed chief metallurgist at Alcoa's Massena, New York, works. **A. M. Miller** will replace Mr. Kessler as assistant chief metallurgist at the firm's Edgewater, New Jersey works. **F. O. Traenkner** has been named assistant chief metallurgist at the Massena works.

Gordon Babbel, president of the Babbel Research Foundation, has sold his interest in Uranium Engineering Company to **T. R. Gillenwaters, Lee Cox**, and **C. L. Chipman**. The firms are all located in Grand Junction, Colorado.

Dooley P. Wheeler, Jr., superintendent of western exploration for American Metal, Ltd., has resigned his position with the firm and entered business as a consulting mining geologist. He will make his office in Salt Lake City, Utah. Mr. Wheeler has been with American Metal since 1949. He has also had experience in geological work in Mexico and Peru, both with private industry and the United States Geological Survey.

Brower Dellinger has been named area exploration engineer for National Lead Company with headquarters in Moab, Utah.

Otto Zmeskal, faculty member of the college of engineering, University of Florida, is doing research work on Florida's rare earth minerals, including titanium, zirconium, uranium, cerium, thorium, lanthanum, praesodynium, which are known to be present in Florida soils. Dr. Zmeskal was one of the 1953 winners of the American Society for Metals' $2,000 award for "outstanding leadership in the classroom and laboratory."

George A. Kiersch, geology professor at the University of Arizona, has been granted a one year leave-of-absence to devote his full time to the directorship of the Mineral Resources Survey, Navajo County, Arizona. The survey is scheduled for completion by the end of 1955. Mineral resources of present value or future potential are being investigated to aid in the modernization and development of the region.

ROBERT C. PRUESS, formerly superintendent of production for Climax Uranium Company, Grand Junction, Colorado, is now superintendent for Continental Uranium, Inc., also of Grand Junction. Properties of the new uranium firm are located in the Big Indian district of San Juan County, Utah.

Ed C. Skinner, industrial engineer for the International Minerals and Chemical Corporation plant at Carlsbad, New Mexico, has been advanced to the position of general superintendent of the Carlsbad operation. Mr. Skinner will be directly responsible for all production and maintenance operations of the mine, refinery, and chemical plant.

Mitchell Melich, Moab, Utah, has been named chairman of the new uranium committee of the Utah Mining Association. Meeting recently in Salt Lake City, Utah to establish the committee were **Vernon J. Pick**, Grand Junction, Colorado; **M. K. Ruddock**, Cal Uranium Company; **E. H. Snyder**, Uranium Reduction Company; **W. H. H. Cranmer**, New Park Mining Company.

Several promotions were recently announced by Kennecott Copper Corporation's Ray Mines Division. **George L. Sharrah**, sub-foreman, was named general mill foreman, and **Hyrum Chlarson** was promoted to millwright foreman. Retiring from the division after 41 years of service was **James E. Drake**, former millwright foreman.

O. "Oscar" Archambeault, head mine captain, Osceola Project of the Calumet Division of Calumet & Hecla, Inc. is pictured above at left. Center picture is T. H. Rapson, master mechanic for the Calumet area. By mistake these two pictures were reversed on page 43 of the November 1954 issue of Mining World in which the unwatering of the Osceola Lode was described. Mining World also would like to give credit to R. J. "Ray" Marcotte, (right) Quality Control Manager, who had such an important part in the safe disposition of the underground water together with all testing of the water before and after pumping began. His important work was overlooked in preparation of the story despite the fact that he furnished much of the data and water analyses.

Harold Mazza, research process engineer, American Potash & Chemical Corporation, has been named assistant director of research. He has been stationed at the company's main plant in Trona, California.

Lithium Corporation of America has announced the following additions to its engineering and production departments at the firm's Bessemer City, North Carolina plant: **J. D. Herman**, project engineer, transferred from the company's St. Louis Park, Minnesota plant; **R. L. Nielsen**, chief design engineer, from St. Louis Park; **H. J. Andrews**, assistant design engineer, from St. Louis Park; **Gerald A. Munson**, general manager, from the Hill City, South Dakota operations; **Daniel D. Michalek**, geologist, from Hill City, South Dakota. New Lithium Corporation employees at the Bessemer City plant include: **Fred A. Dixon**, buyer; **Edward F. Golob**, chemical engineer; **J. W. Setzer**, chemical engineer; **R. E. Jurkovski**, electrical engineer; **C. J. Vanderbilt**, mechanical engineer; **Joseph N. McClure**, mine superintendent; **Clyde H. Robinson**, assistant geologist.

OBITUARIES

Edmund J. Longyear, 76, founder of the E. J. Longyear Company of Minneapolis, Minnesota, died December 4 in Los Angeles, California. He was a pioneer in the development of the iron ores on the Mesabi Range and superintended the first diamond drilling program there in 1890. As founder of the firm which bears his name, Mr. Longyear transformed a small drilling company into an internationally known drilling equipment manufacturer and exploration contractor.

Edward Thomas Plott, 44, business manager of Lithium Corportion of America's Bessemer City, North Carolina plant, died November 12 following a heart attack. He had joined Lithium Corporation in 1946 and had spent several years in the company's advance work, securing property and mineral rights to spodumene-bearing properties in the Bessemer City area.

Mack C. Lake, 64, former president of United States Steel Corporation's Orinoco Mining Company, died November 10 in San Francisco, California. The internationally known mining engineer and geologist had directed explorations that led to the discovery of the iron ore deposits at Cerro Bolivar, Venezuela, seven years ago. He had retired as president of Orinoco last year.

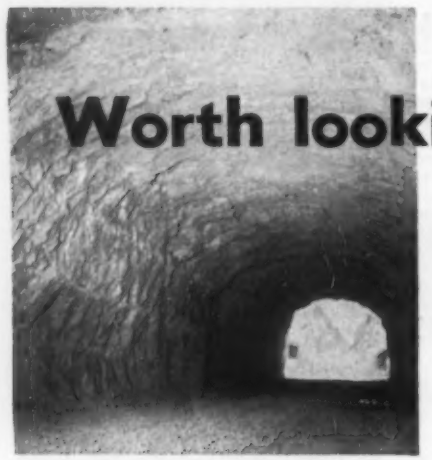
James J. Carrigan, 68, former manager of mines for Anaconda Copper Mining Company, died October 17 in Green Bay, Wisconsin. He had retired from active business in 1947 at which time he was manager of mines at Butte, Montana. He had been a mining engineer since 1907.

C. J. (Jack) Abrams, 64, veteran executive of the Climax Molybdenum Company and widely known figure in the mining industry, died October 17 at his home in Denver, Colorado following a lengthy illness. He had been director of Climax's newly formed exploration division since last December. Mr. Abrams was first employed by Climax in 1928, and since that time had served as superintendent of both the mine and mill and as general superintendent.

George H. Rupp, 64, manager of the mining department of Colorado Fuel & Iron Corporation, died October 11 in Pueblo, Colorado. He became manager of mines for CF&I 25 years ago and is credited with having rehabilitated and modernized the corporation's coal, iron, dolomite, and other properties. He was an exponent of modern mining techniques, and, during his years of supervisory service, CF&I mines won many national safety awards.

Alex McDonald, who was in charge of the exploration work for Anaconda Copper Mining Corporation at the Yerington, Nevada project from 1940 to 1947, died during October in Salt Lake City, Utah. Since 1947 Mr. McDonald had spent the greater part of his time doing geological inspection work for Anaconda at its widespread properties.

S. J. Swainson, 53, for many years director of American Cyanamid Company's mineral dressing laboratories at Stamford, Connecticut, died October 22 in Southold, Long Island. An outstanding figure in the field of mineral dressing, Mr. Swainson had for several years supervised the operations of the U. S. Atomic Energy Commission's research laboratories in Winchester, Massachusetts. He was one of the founders of the Mineral Beneficiation division of the American Institute of Mining and Metallurgical Engineers.



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Newsmakers in International Mining

Harry J. Wolf, mining engineer and consultant with headquarters in New York City, made a recent trip to Cuba to investigate several copper properties there. During recent months he has been traveling in the southwestern states examining uranium, copper, and tungsten properties.

Tom T. Heywood, mining engineer, is now with the Dungun Iron Mines in Malaya, subsidiary of Eastern Mining and Metals Company, Ltd. Earlier he had resigned as mining engineer for the Sierra Leone Development Company, Ltd.

W. H. Durrell, general manager of Hollinger-Hanna Limited, was named vice president of the firm, which acts as agent for the Iron Ore Company of Canada. Named to replace Mr. Durrell as general manager was **C. E. McManus,** formerly project manager of the Iron Ore Company of Canada.

E. W. Douglass, former director of research for Potash Company of America, Carlsbad, New Mexico, has accepted a job as consulting engineer with the Anglo-Lautero Nitrate Corporation in Chile. He will be located at Maria-Elena, Chile while on the assignment.

John M. Russell, mining engineer, joined the Colonial Development Corporation as Manager of the firm's Murongo Mines Investigation recently and is making his headquarters at Kikagati, Uganda. Formerly he was with Kirwa Wolfram Mines Ltd., Kabale, Uganda.

H. G. McKerrow, chief consulting engineer and a director of Anglo American Corporation, has been appointed to the boards of Amalgamated Collieries of South Africa, Brakpan Mines, Loraine Gold Mines, President Brand Gold Mining, President Steyn Gold Mining and Vaal Reed Exploration & Mining.

J. Nel Fourie, managing director of American Abrasives S. A. Ltd. from Pietersburg, South Africa, recently investigated the newly discovered corundum field near Vila Pery, Mozambique. (See **Mining World,** July 1954, Page 80, for first report on this discovery).

A three-man Burmese purchasing mission, headed by **U. Kyi Win,** general manager of Burma Railways, has been on a visit to the United States and seven European countries where the group plans to spend $23,000,000 on equipment for Burmese agriculture and industry.

Sir Denys Lowson, Bart., a director of the Mountain Copper Company, Ltd., parent company of the San Francisco Chemical Company, recently visited the firm's phosphate mining operations in the Bear Lake Basin of Idaho. Sir Denys, a former Lord Mayor of London, visited the operation two years ago. On his current tour of inspection he was accompanied by **D. L. King,** general manager of the San Francisco Chemical Company.

Mohamed Samih Afia, geologist of the Egyptian department of mines, Cairo, Egypt, recently visited government base mineral and gold mines in Southern Rhodesia.

H. L. Talbot, formerly metallurgical superintendent with Rhokana Corporation, Kitwe, Northern Rhodesia, is now a mining consultant in Boston, Massachusetts.

Ludlow G. Anderson, for the past twelve years chief of the coal and accident-prevention branches of the U. S. Bureau of Mines at Anchorage, Alaska, has been transferred to the Bureau's Phoenix, Arizona office as a mining engineer. He replaces **Ernest R. Rodriquez,** who is now at the Denver, Colorado office.

N. van Weenen, managing director of the Lepidolite Development Corporation, Ltd., Salisbury, Southern Rhodesia, has been in Germany and the United Kingdom investigating new litium-minerals beneficiation methods for low-grade lepidolite. His firm now operates four lepidolite mines in the Federation of Rhodesia and Nyasaland.

Earl M. Irving, chief of the United States Geological Survey in the Philippine Islands, has returned to the United States on vacation.

Frank Ayer, former general manager of Mufulira Copper Mines Ltd. and Roan Antelope Copper Mines, Ltd. Northern Rhodesia, recently returned to the operations for a visit after a 14-year absence. Mr. Ayer, who is on a world tour, reported that he was deeply impressed with technical developments and improved employee conditions at the Northern Rhodesian operation.

Several Mexican technical experts have been awarded scholarships by the United States government for post-graduate studies in their particular fields as part of the United States aid program to Latin America. Receiving grants to study problems of the Mexican mining industry for one year in the United States were **Antonio Alcantara, Roberto Cortes, Jose Reyna, Zenon Colunga, Manuel Quiroz,** and **Jorge Moreno.**

George L. Revesz, who has been with Huaron Mines in Peru, has been transferred to the company's headquarters in Cannes, France. At his new location, Mr. Revesz holds the position of power superintendent.

The Pakistan government has named the following members to its newly created mining board: **Anwar Ali Khan, Rafiq Ahmad, S. Iqbal Shah, Haji Dost Mohammad, Mustafa Din.**

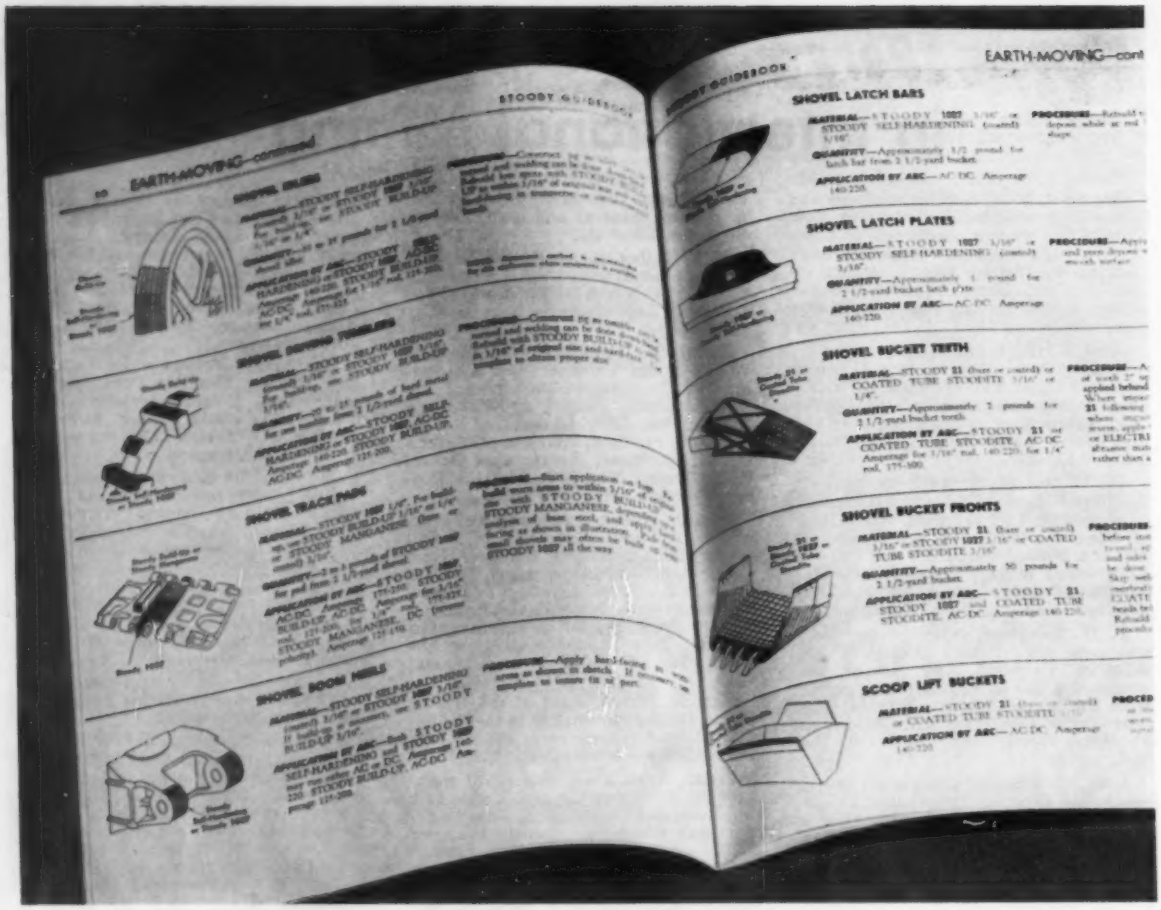
Gordon H. Fairmaid, a director and former general manager of Pahang Consolidated Company Ltd. in Malaya, has been appointed managing director. **F. H. Way** has succeeded Mr. Fairmaid as general manager.

R. Versluis, mining engineer, is employed at a diamond mine near Kimberley, South Africa.

Freidrich Spetling, Martin Fleischmann, and **Hans Henne,** representatives of the German potash industry, have been visiting United States mining operations recently. Dr. Henne is fabrikdirektor of the Gwerksschaft Wintershall in Heringen/Werra. The other two engineers are with Burbach-Karliwerke Aktiengesellschaft at Wolfenbuttel.

Willard Benham, mining engineer, is in charge of exploration activities at the San Alberto tungsten mine. The mine is under option to the San Luis Mining Company, Tayoltita, Durango, Mexico.

Five Mexican government officials attended the recent annual convention of the New Mexico Mining Association and the Southwest International Mining Association in Carlsbad, New Mexico. They were (left to right): GUSTAVO P. SERRANO, president, Chamber of the Mining Industry; SALVADOR CORTES OBREGON, director general, Mineral Resources Institute; ALBERTO TERRONES BENITEZ, Senator from the Republic of Mexico; JORGE NIETO CASES, Presidential Commission for National Economics Development; DAVID SEGURA Y GAMA, director general, Mexican Bureau of Mines. Senator Benitez praised the program presented by mining leaders of both countries at the sessions, which were attended by 600 delegates, as "an example of what can be accomplished when private enterprise is allowed to develop under advanced technical conditions." He said that the communal spirit displayed by the industries of the two republics is evidence that the tightening of economic and social bonds between the U.S. and Mexico is fast becoming a reality.



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National Lead Plant Planned for Argentina

A contract for the engineering design and construction of a mining and metallurgical installation for the National Lead Company, S.A. of Argentina has been awarded to the Southwestern Engineering Company of Los Angeles, California. Total investment in the project will be approximately $4,000,000, with construction scheduled to begin shortly.

The project includes erection of a lead, zinc, and copper concentrator, power plant, pipe line, and housing for personnel. The operation will be located approximately 900 miles from Buenos Aires, near the Chilean border, and concentrate output will be transported to the smelter and manufacturing plant of National Lead at Buenos Aires. About two years will be required for completion of the project, according to present plans.

New Firm to Mine Tin Off Siamese Coast

A new company, Aokam Tin Ltd., has been incorporated in the Federation of Malaya to dredge tin off the coast of Thailand (Siam). The Siamese government has indicated its intention to exercise its rights to subscribe 45 percent of the capital. The balance will be held by Tromal Prospecting Ltd., who will distribute the shares proportionately among the Tronoh-Malayan tin group which formed Tromal.

The Siamese government has granted three leases covering an area of about 7,500 acres for a period of 25 years from January 1, 1954. This area is estimated to contain some 49,000,000 cubic yards averaging 1.45 kati or 1.93 pounds per cubic yard, and to have a total of 710,500 piculs or 42,292 tons of tin concentrate.

The tin is concentrated in a bed varying from 12 to 15 feet thick underlying from 60 to 70 feet of the sea. Operations will be carried out by grab-dredging, a method in common use for river and harbor dredging, but not normally associated with alluvial tin recovery.

Now Three Types Of Minerals Stockpiles

Government officials have recently released a report giving the history of mineral stockpiling and definition of the three current stockpiles.

Earliest stockpiling was under the jurisdiction of the Munitions Board which set objectives, and the Board always took the position that these objectives were minimum.

During the early part of the Korean War, the Munitions Board and the Defense Production Administration jointly established minimum objectives which were termed "peril points." In some cases these were equivalent to minimum objectives and every effort was made for their achievement.

When stockpiling was transferred to ODM, and after the President's directive of March 26, 1954, new terminology on objectives was set as follows: (1) minimum objective; (2) long-term objective; and (3) supplemental.

The minimum objectives were, in some cases, decreased. Others remained as they were, while others were increased. The long-term did, in most cases, increase most of the objectives. The long-term objective eliminates from calculations most foreign sources of supply and lays the emphasis upon sources of supply domestically, Canada, Mexico and Central and South America.

The supplemental list is for materials for which this country must depend upon foreign sources of supply. However, quantities contained in the supplemental are over and beyond what has been planned to meet a national emergency.

The supplemental stockpile can be acquired only by the sale of surplus farm commodities for foreign currency and the foreign currency then used for the purchase of the strategic materials. Further, the items on the supplemental list are those for which the ODM feels that it can certify as being materials which would assist the defense effort of the United States.

In order of priority, the minimum objectives must first be met. Secondly, the long term objectives should be met —say within a period of three to five years. The supplemental is to be acquired only as and if surplus commodities are sold for foreign currencies and foreign currencies are made available for purchase.

Boliden's New Ore Plant Completed in Sweden

The largest base metal concentration plant in Europe was inaugurated at Boliden, northern Sweden, in the middle of September. Having a capacity of 500,000 tons of ore annually, the new plant forms part of a five-year extension program, launched by the Boliden Mining Company and aiming at a total annual mining and refining capacity of over 1,600,000 tons. When completed the whole scheme will have cost Kr.125,000,000 ($25,000,000), one-fifth of which has been spent on the plant just inaugurated.

The known ore deposits of Boliden at present amount to about 42,000,000 tons, distributed over 10 mines, all situated within the same district of northern Sweden. Extensive prospecting research is being done, and new lodes are found from time to time. Kr.3,000,000 ($600,000) is spent annually on prospecting. The company's own scientists working in close collaboration with Swedish geophysical firms are constantly seeking unknown deposits.

Iron and copper pyrites, galena, and sphalerite are the most common ore minerals in the Boliden area, but gold and silver are also extracted from these complex ores. About 60 tons of silver and two tons of gold are produced annually at Boliden.

Marsman Group Explores Philippine Chromite Find

The Marsman mining interests are exploring a new chromite discovery on Palawan Island in the Philippines where preliminary analyses have indicated chromite of high quality assaying between 58 and 62 percent Cr_2O_3, with a Cr/Fe ratio of 3.4 and higher.

Reported by Tagbanua tribesmen during World War II, the character of the deposit remained essentially unrecognized until mid-1952 when P. C. Macasaet of Puerto Princesa and others formed the Palawan United Mining Association and filed mining claims over the area. At the insistence of Mr. Macasaet, George Newman investigated the deposit and found the outcrops to be very encouraging so shortly thereafter a vigorous surface exploration program was undertaken. Now diamond drilling is being conducted by the Marsman group.

The deposit is 18 airline kilometers northwest of Puerto Princesa and at an elevation of about 2,000 feet. It is on the slope of Mt. Beaufort and lies immediately south of the saddle between Mt. Beaufort and Mt. Malinao. The deposit is reached by a foot trail that leads northward from the north gate of the Iwahig Penal Colony and then follows the Irahuan River, a total distance of 14 kilometers.

Peru and United States Sign Uranium Contract

An agreement has been signed by the Peruvian Board of Control of Radioactive Substances and the United States Atomic Energy Commission governing the sale of uranium ores and concentrates to the United States. Colonel Jorge Sarmiento, president of the Peruvian Board, reports that the contract fixes the prices for uranium ores, and provides for the maximum and minimum quantities which may be purchased. The agreement also provides for installations that may be made in Peru for the more efficient treatment of the ores, including installation of concentration plants in areas where low-grade ores are found in large quantities.

Law No. 12004 passed by the Peruvian Congress in 1953 authorized private industry to develop uranium-bearing deposits with the sale of all production to the state. To handle the transactions the Board of Control of Radioactive Substances was established. The scale of prices per ton set up by the board is as follows:

% U_3O_8 Content	Basic Price	Bonus	Less Treatment Charge	Net Price
0.5	$ 38.50	$13.75	$15.00	$ 37.25
0.75	57.75	20.62	15.00	63.37
1.00	77.00	27.50	15.00	89.50
1.50	115.00	41.25	15.00	141.75
2.00	154.00	55.00	15.00	194.00

R. R. Beard, geologist with the Raw Materials Division of the U. S. Atomic Energy Commission, is in charge of the exploration program for uranium which is being carried out under operating agreements with Peru and several other countries.

Portugal Places Certain Minerals "Off Limits"

By a government decree, all prospecting for tantalite, zircon, and beryl minerals has been closed in Portugal and its overseas territories. Previous claim holders are not affected by the law.

For legal purposes, these minerals are now considered the same as the radioactive minerals which were closed to prospecting in the entire Portuguese empire several years ago. The last tantalite exploration grant before publication of the new decree was obtained by Companhia Portuguesa de Minas S.A.R.L. for two occurrences in District Viseu.

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INDIA—The *Panna Diamond Mining Syndicate, Ltd.* in Madhya Pradesh is reported to be negotiating with the Soviet government for the development of the company's mines. The Russian government would supply all heavy mining equipment and would supply technical assistance in building of the plant and training of competent Indian personnel. Recent drilling to a depth of 250 feet has indicated diamonds of varying size and quality. The company estimates a recovery of 10 carats per 100 tons of ore washed, while two Russian experts have estimated at between 11 and 25 carats per ton, depending upon depth.

JAPAN—Except for gold and silver production, smelter output in October was higher than in September, reports the Japan Mining Association. Production of zinc metal was the highest it has been in the postwar period. Electrolytic copper was greatly increased over September, reflecting actual offers from overseas. However, quicksilver was decreased because the producers could not import any foreign ore. The major metal smelter production in October was as follows (figures in parentheses are September figures): gold 588,170 grams (633,809), silver 17,386 kilograms (18,430), electrolytic copper 8,172 metric tons (7,584), electrolytic lead 2,824 metric tons (2,737), electrolytic zinc 6,174 metric tons (5,679), retort zinc 2,834 metric tons (2,703), refined tin 81 metric tons (78), nickel 215,151 kilograms (208,655), quicksilver 13,671 kilograms (12,480).

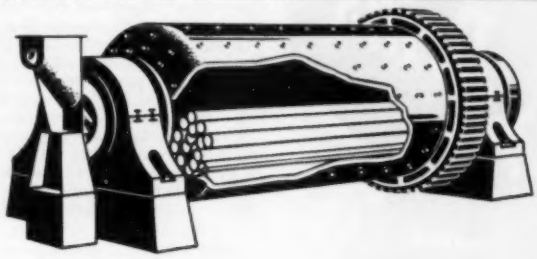
INDIA—The 10-year old *Bellara* gold mines in Mysore state have been closed because of insufficient ore. The pilot project in Tumkur district yielded 893 tolas of fine gold in 1953-54. In closing down operations, the government acted on the advice of *John Taylor and Sons* of the Kolar Gold Fields. According to the Industries Minister, the value of gold extracted at Bellara mines last year was 75,242 rupees, while labor costs during the same period totaled 72,915 rupees.

HONG KONG—The new iron ore processing plant owned jointly by *Nittetsu Mining Company* of Japan and the *Mutual Trust Company* of Hong Kong has been officially opened. An investment of 3,500,000 Hong Kong dollars was made in the new plant which has a production capacity of 500 tons of high-grade iron ore daily. The two firms together are developing the *Ma On Shan* iron mines on the Kowloon Peninsula.

INDIA—The Atomic Energy Commission has asked the Andhra University to undertake the survey of reserves of monazite and other radioactive minerals on the beach sands of the Godavari in Sisakhapantam and Srikakulam districts. Large deposits of monazite were found on the beaches of Bimlipatnam near Visakhapatnam last year and the central government, at the insistence of the Andhra government, is examining the extent and quality of the ore. The extensive survey ordered by the Atomic Energy Commission followed reports that the 200-mile long coast in the three districts was potentially rich in monazite. Professor P. Mahadevan of the Geology Department of the University will be in charge of the survey.

PAKISTAN—Mining of iron ore has been successfully carried out on an experimental basis with nearly 816 tons of ore produced during the last three months. Development on a commercial scale is expected to be undertaken soon on the iron ore deposits in the Kalabagh Range. The search continued with other deposits reported in Chitral State and laboratory tests on samples are already under way. It is also reported that Chaudhry Abdul Karim, who holds a lease on the Kalabagh deposits, plans to erect a 20,000-ton pilot plant to manufacture pig iron. A similar plan is also being studied by the Pakistan Industrial Development Corporation.

ITALY—Some 44,077 flasks of mercury were exported during the first eight months of 1954, compared with 21,947 flasks in the same period of 1953. Most of the shipments went to the United States. During the first six months of 1954, Italy produced 133,000 tons of bauxite, compared with 125,000 tons in



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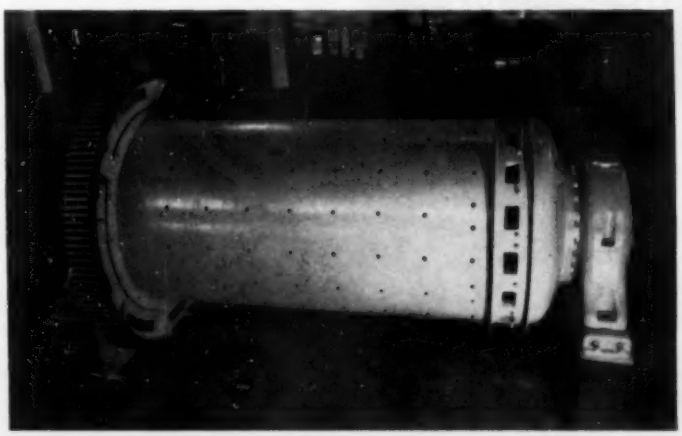

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the same period of 1953, and 129,400 in the corresponding period of 1952. Output of high-grade zinc ore during the first six months totaled 94,600 tons, compared with 83,000 and 89,300 tons in the corresponding periods of 1953 and 1952. Low-grade zinc ore output increased to 37,150 tons compared with 24,900 tons and 28,200 tons, respectively. Production of zinc metal totaled 31,165 tons against 27,875 and 27,500 respectively.

NORWAY—Trial runs have started at the new iron ore loading plant at Narvik which is to be the largest and mos' modern in Europe when completed late in 1955. The new plant has a capacity of 4,000 tons an hour, providing a maximum capacity of about 15,000,000 tons per annum. Partial operation this year is expected to total about 8,000,000 tons.

FRANCE—During the first nine months of 1954, 32,061,000 tons of iron ore were produced compared with 31,407,000 tons in the same period of 1953. Deliveries to consumers during this period amounted to 30,665,000 tons, compared with 31,027,000 in the corresponding period of 1953. Of this, 17,815,000 tons (18,724,000) went to the domestic market; 4,543,000 (4,928,000) went to the Saar; and 8,307,000 (7,375,000) tons were exported.

POLAND—Six new iron ore mines are reportedly under construction in the Czenstochowa district. Spending four and one-half times as much money for the mines during 1954 as it did during 1950 (amount then not known either), Poland intends to widen the raw material basis for the Polish iron industry. One of the mines, the *Barbara* shaft, is hoped to yield five times the entire amount of iron ore mined in pre-war Poland by all Polish mines together.

USSR—The aluminum production of the Soviet Union is stated to be 400,000 metric tons per annum, while the pre-war level amounted to only 40,000 metric tons. The former German aluminum works of Lauta and the Bitterfeld plant, with a combined capacity of 60,000 metric tons, were dismantled by the Soviets in 1946 and are now operating in the Soviet Union.

AUSTRIA—The *Ranshofen Aluminum Works* has gone into winter operation which means a reduction from 100 percent capacity. During the summer of 1954, all 10 plants were in operation for the first time in this firm's history. However, reduced availability of electric power during the winter makes it necessary to cut back to six plants now, and possibly only four or five plants in operation during the next few months.

BELGIUM—The *Societe Generale Metallurgique de Hoboken* reports that it is producing germanium at its plant at Olen. This is electronically pure germanium oxide recovered from the flue dusts of *Union Miniere du Haut Katanga's* copper-zinc smelting operations in the Belgian Congo. The Societe has successfully fabricated the metal and has built a semi-industrial plant for production of germanium oxide and germanium metal. A full-scale plant is now under construction.

SPAIN — *Fluoruros, S.A.* reportedly plans to build a new fluorspar mill with the aid of a $400,000 loan from the Export-Import Bank. Fluoruros operates two mines and a mill for the production of metallurgical grade fluorspar. Recently

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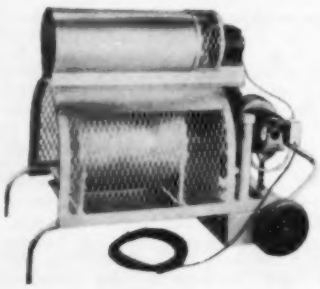

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appointed director of operations is William Kuster who has been with the *Ozark Mahoning Company* in the United States.

PORTUGAL – *Minerals Engineering Company* of Grand Junction, Colorado is reported to be investigating a tungsten prospect in the mountains beyond Porto, Portugal.

AUSTRIA–The most recent ordinance of the Ministry of Trade and Reconstruction–the decree governing the collection and distribution of lead, zinc, tin, and copper–is being criticized by Vienna businessmen. Pointing out that these materials are available without license on world markets, it is said that lead, zinc, and copper decreased so much in importance during the past few years that even in the Battle Act (U.S. Embargo list) these raw materials no longer appear. Business circles in Vienna point out that less than 50 percent of the Austrian copper requirements are filled from domestic sources, slightly more than 50 percent of lead, and about 80 percent of pared to the indigenous materials. The control and distribution functions of the Ministry's department are not furthering all zinc. Imports are not difficult, nor is the price level too unfavorable as comprivate initiative and do harm the speed of transactions.

FRANCE–*General American Transportation Corporation* of Chicago has licensed the *Societe Europenne de Revetement Chimique* (S.A.) exclusively to use and to sub-license General American's Kanigen plating process in several countries and territories. The Societe, a new company to be known as SEUREC, is composed of 10 well-established French industrial firms. SEUREC pays an initial fee of $500,000 which covers rights to the process, and continuing royalties will be paid based upon pounds of nickel deposited by SEUREC and its sub-licensees during the next 20 years. One-half of any sub-licensing fee received by SEUREC will also be paid to General American. A pilot plant will be installed at Etablissements Studler in Paris, and it will be followed by other commercial plants soon. The process is an entirely new type of nickel plating; it is purely a chemical process, requiring no electricity.

WALES–In North Wales, the operation of the *Parc* mine near Llanwryst continues to be satisfactory under the direction of *Johannesburg Consolidated Investment Company*, while the *Trecastel* lead mine in the same vicinity is also in operation. A syndicate has been formed to investigate the possibility of reopening some of the gold mines in Merioneth, North Wales, and to sample the dumps from old workings with a view to recovering gold from them.

COLOMBIA – The *South American Gold and Platinum Company* has acquired more than one-third of the capital stock of *Pato Consolidated Gold Dredging, Ltd.* Both firms operate in Colombia. South American purchased 1,200,000 shares of the 3,502,500 shares outstanding, for an undisclosed amount. The firm also received the right to name three members of the six-man board of directors. The three new members will be Lewis B. Harder, president of South American; Coleman W. Morton, a director of South American; and C. A. Banks, chairman and managing director of Pato. Purpose of the acquisition is to consolidate South American's earnings and to augment and improve its mining activities. Pato operates seven dredges on properties on the Nechi River and its tributaries in the Department of Antioquia. For the nine months ended September 30, 1954, the firm dredged 19,646,100 cubic yards to recover 139,144 fine ounces of gold.

PERU–The Mining Bank of Peru has completed construction of a 70-ton-per-day concentrator at an elevation of 4,500 meters in the Province of Huarochiri, department of Lima. The plant was manufactured by the *Denver Equipment Company* of Denver, Colorado, and cost about 2,750,000 Soles. An additional expense of 1,500,000 Soles to double plant capacity is being considered by the bank. The new plant will treat silver, copper, lead, and zinc ores of the region by flotation. The rugged topography of the region and the lack of transportation facilities made movement of the 250 tons of heavy machinery, equipment, and materials to the concentrator site a major problem.

CHILE–Copper production in the first eight months of 1954 totaled 201,728 metric tons. The *Braden Copper Company* returned to a seven-day work week in October and the large Chuquicamata plant of the *Chile Exploration Company* (*Anaconda Copper Mining Company* subsidiary) was also expected to increase production shortly. The lower chamber of the Chilean Congress has been studying a new taxation plan to be applied to the United States companies operating in Chile. The first of 36 articles in the new plan has already been approved. This provides for a 50 percent tax on profits from total production; also there will be a maximum 25 percent surtax on profits from production above the "basic" level–that is, output not exceeding 95 percent of the average amount of copper produced by each company from 1944 to 1953. The surtax reduces in proportion to increased output.

CUBA–The *Nickel Processing Corporation* mined 340,813 tons of ore during July, August, and September 1954, exporting 2,671 tons of nickel oxide and 1,680 tons of granulated nickel. It also processed 348,735 "dry" tons. The production came from the company's five concessions around the town of Mayari in Oriente Province–*Bella Maria, Gloria, Casualidad, San Juan,* and *Arroyo Blanco.*

VENEZUELA–Exports of iron ore have steadily increased since 1951 when 715,386 metric tons were shipped out of the country. In 1952, the country exported 1,888,614 metric tons; in 1953, 1,972,770 metric tons; and in the first six months of 1954, 2,183,420 metric tons.

MEXICO–Of the approximately 3,400 mining properties in the Guanajuato and De La Luz mining zones, only 26 are currently being worked, 300 are idle though their concessionaires hold onto their rights, while 3,075 have been abandoned or turned over to the national reserve, reports the National Chamber of Commerce of Guanajuato City. The organization blames the situation on excessive taxation, and heavy indemnization payments to employees which, it charged, caused the collapse of the *Guanajuato Reduction & Mines Company* and the *Guanajuato Consolidated Mining & Milling Company.* The chamber pointed out that taxes on gold and silver production rose from 2.5 percent in 1905, to 19.9078 percent in the case of gold, and to 35.16 pesos per kilo in the case of silver, plus

Mexican Flotation Mill Goes Into Production

Compania Minera y Beneficiadora de Sombrerete, S.A., located in the San Martin mining district, municipality of Sombrerete, state of Zacatecas, Mexico, has placed its new selective flotation mill in operation. With a capacity of 200 tons per day which will gradually be increased to 400 tons, this plant will treat the ores delivered by Compania Minera de San Martin, S.A. The San Martin firm controls all of the principal mines in this locality. They were previously operated by Compania Minera de Dos Estrellas S.A., and then sold to San Martin. The new plant will also serve as a custom mill and will buy ores from the small mines in the vicinity. The ore delivered by San Martin contains low-grade values of silver, lead, copper, and zinc. A lead-copper concentrate will be produced, and shipped to the Torreon smelter of Cia. Metalurgica de Penoles (American Metal Company). The zinc concentrate has been contracted for by Philips Brothers of New York through Erwin O. Binz, representing them in Mexico.

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25.5 percent of the present silver quotation of 340.86 pesos a kilo. In addition to these levies on gross production, the chamber added that mining companies must also pay taxes on income, a special mining tax, and others for schools, weights and measures, inspection of motors, as well as a State predial impost. As a possible solution, the group urges a program designed to rescue mining from what it calls "complete decadence." It calls for abolition of all taxes on the industry with the exception of the income tax, temporary exemptions from import duties on machinery and equipment essential to the industry, and the turning over to the government social security agency of the obligations of indemnity payments to employees retired for incapacity.

ARGENTINA—In the province of Mendoza, Rio Diamante zone, studies are under way to reopen the *Mapocho Company's* lead mine. There is a plant at the mine site which is capable of treating 275 tons of lead daily.

PERU—Steps are being taken to increase the daily capacity of *Cerro de Pasco Corporation's* copper milling section in the Paragsha concentrator from 650 tons a day to 1,000 tons. Because of increased reserves of copper milling ore, the construction of a separate integrated copper concentrator is now being considered.

MEXICO—Discovery of uranium deposits at Villa Aldama, some 35 kilometers from Chihuahua in state of Chihuahua, has been reported. Although details have not been revealed, the find is said to have been made on the property of Senora Francisco Perez.

ARGENTINA—Development of lead and zinc deposits in the *Los Ratones* mine is continuing. The mine is located in Fiambala, Province of Catamarca. Present work is on a 100-meter extension on levels five and seven.

AFRICA

UNION OF SOUTH AFRICA—The *Middelvlei Estate Company* has entered into an agreement with *Venterspost Gold Mining Company* for the latter to prospect 1,883 claims on the farm Middelvlei 28, north of the *Venterspost* mine. The prospecting operations will be conducted at the expense of the Middelvlei company which has realized and will continue to realize certain of its investments for this purpose. The agreement provides that the prospecting operations will be advanced for a distance of about 6,000 feet on the Ventersdorp Contact Reef horizon at a depth below surface of about 2,600 feet. Preliminary to prospecting operations, the Venterspost company is crosscutting from its 9th level drive north to the contact reef and then will advance a drive on reef to the common boundary with the Middelvlei holdings. Middelvlei also holds mineral rights over 207 claims on the farm Gemsbokfontein 31, adjacent to the *Randfontein* mine. These claims are subject to an agreement with the *Johannesburg Consolidated Investment Company* terminating on November 30, 1956. The agreement provides for participating rights for Middelvlei if Johan-

nesburg Consolidated should exercise its rights under the agreement.

FEDERATION OF RHODESIA AND NYASALAND – Promising high-grade manganese deposits have been discovered by the *Luapula Mines Ltd.*, a subsidiary of the *Rhodesian Selection Trust*, in the Fort Rosebery area, Northern Rhodesia. Luapula Mines has been carrying out an intensive mineral search program for some months in its exclusive reservation. Showings of copper ore and other base minerals are also being investigated.

UNION OF SOUTH AFRICA–*Hartebeestfontein Gold Mining Company Ltd.* has completed sinking of its No. 1 shaft to a final depth of 3,041 feet. Sinking of the No. 2 shaft was suspended at 3,297 feet, this depth being judged sufficient for present requirements. Preliminary level development has been started from both shafts. Erection of the reduction plant which will have an initial capacity of 50,000 tons a month, was started during the third quarter of 1954.

NIGERIA–*Tin & Associated Minerals* is the newest company to become a columbite producer in the country. In the financial year ended March 31, 1954 the company had produced 188 tons of columbite and it is expected to have an output of 280 tons during the current year until March 31, 1955. This objective appears to be well within the mine's capacity for in three months (June, July, and August) the columbite output had exceeded 113 tons. By comparison it may be noted that the six main Nigerian columbite producers–*Amalgamated Tin, Bisichi Tin, Gold & Base Metals Mines, Keffi, Jantar*, and *Naraguta Tin*–are producing at the rate of 1,500 tons per annum. The bulk of this production is going to the United States and it is believed that Tin & Associated Minerals will also ship there.

UNION OF SOUTH AFRICA–The *President Steyn* mine, which officially started gold production in April 1954, has completed the extension of its reduction plant to a milling capacity of 125,000 tons a month, and its uranium plant is ready to go into operation.

NORTHERN RHODESIA–Installation of the crusher-conveyor system, an integral part of *Mufulira Copper Mines Ltd.'s* huge underground program, was brought a step nearer completion recently with the delivery of the bases of two McCully crushers to the 1820 level. So far installation work on this system has managed to keep pace with the re-equipment of Boise shaft and its ancillary services. Each base weighed 27 tons, the heaviest single pieces of equipment yet delivered underground. They were lowered through No. 9 shaft to the 1650 level and then railed along the main haulage level to the crusher service winze and lowered into place on the 1820 level. With its component parts, each crusher weighs 80 tons. Eighty feet above the crushers, the new jaw crusher station has been completed. When the system is finished, it will be possible to put the present mine output of 300,000 tons a month through it. However, with the present unsatisfactory power position, it is likely that ore from the 1150 level will continue to be put through the 1200 jaw crusher and the 1350 Selkirk shaft loading box. Therefore, to begin with, the new crusher-conveyor system will probably one handle ore mined on the 1400 level which is between 30,000 and 50,000 tons monthly. Future plans call for a total production of 360,000 tons monthly going through this new system by 1956.

OCEANIA

AUSTRALIA – The Commonwealth government has announced that it will pay up to £A2 per ounce subsidy for gold produced in Australia, Papua, or New Guinea in the next two years. Payment will be adjusted in accordance with mining costs and will not be made to assist in lifting profits over 10 percent of capital. The subsidy will be of great assistance to marginal mines and companies developing large, low-grade ore bodies such as *Great Western Consolidated N.L.* and *Southern Cross*.

PHILIPPINE ISLANDS–*Hixbar Gold Mining Company*, which owns a cupriferous pyrite property at Rapu Rapu, is now operating its own mine after transfer of the operating option from *L. R. Nielson & Company* to the original owners. Hixbar will continue to fulfill its commitment with the *National Power Corporation* to sell pyrite for the Maria Cristina chemical fertilizer plant at Iligan City. Ore high in

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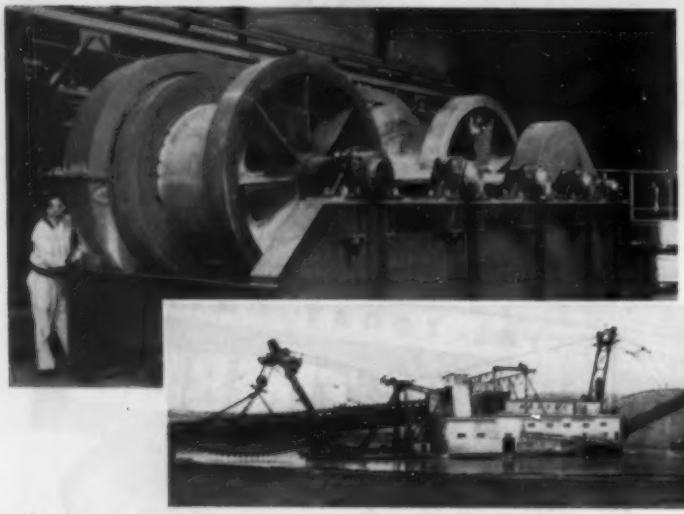

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copper content may be shipped to Japan through the *Pacific Mining Company*. This latter firm is interested in buying copper ores, preferably as saving over 5 percent copper content.

NEW ZEALAND—The *Eagle Picher Company* of Cincinnati, Ohio, has agreed to send a geologist and a mining engineer to inspect the Te Aroha Hill at Te Aroha, 97 miles south of Auckland. The *Auckland Smelting Company* has been examining the hill for copper, lead, and zinc. Eagle Picher will diamond drill the deposit to see whether there are sufficient metals to justify a $5,000,000 to $6,000,000 investment. Also, its policy will be governed by the attitude of the New Zealand government. New Zealand has never produced copper, lead, or zinc in quantity and the discovery of large workable ore bodies would be of utmost importance.

PHILIPPINE ISLANDS—Rising temperatures in old fire areas in the *Mindanao* gold mine of the *Surigao Consolidated Mining Company* have forced the temporary abandonment of these sections. At the same time, plans have been made to concentrate development on the 900 level. Some development ore from this level has already been sent to the mill and actual stoping operations are about to begin.

NORTHERN TERRITORY—*Peko (Tennant Creek) Gold Mines N.L.* is producing 1,200 tons of eight percent copper ore per month from which 350 to 400 tons of concentrate are being obtained. Grade of concentrate is 23 percent Cu. Until stopes from the 400-foot level are in production, grade of ore will not rise above eight percent. Development work recently carried out disclosed rich cuprite ore over a length of 78 feet on the 200-foot level. Because of difficulty in treating this, it will be dispatched to custom smelters at Port Kembla, New South Wales. The company hopes to produce metallic copper at an eventual rate of 19 tons per day when a fluosolids plant is completed.

TASMANIA—*Broken Hill South Ltd.* of Broken Hill, New South Wales, has started producing high-grade silver lead concentrate at Zechan. Present mill throughput is 350 tons weekly, but capacity is 750 tons. No clear picture of the mine's future will emerge until development of the 420 and deeper levels can be carried out. Also at Zechan, *Montana Silver Lead N.L.* reports that the large ore body unexpectedly cut out below the 300-foot level. The company recently began to operate a concentrator and could be in a difficult position if more ore cannot be disclosed.

FIJI ISLANDS—The colony expects to have exported 10,000 tons of 50 to 60 percent Mn when the figures for 1954 are totaled, and sufficient reserves are available to maintain this rate for some years. The Department of Mines mentions development of 11 prospects and three mines for manganese on the island of Viti Levu, and detailed investigations between the Sigatoka and Nadi Rivers have contributed to new discoveries. A belt known as Tabuquto-Nasaucoko area contains high-grade manganese and will be in full production soon.

NEW GUINEA—*Bulolo Gold Dredging, Limited* operated its dredges Nos. 2, 4, 5 and 7 throughout the last fiscal year ended May 31, 1954. During that time, 13,941,000 cubic yards were dredged to recover 70,854 ounces of fine gold and

31,737 ounces of silver. Total reserves available for future operation were estimated at 49,133,500 cubic yards, comprising 40,734,500 yards of dredgable gravel having an estimated average value of 17.4 cents per cubic yard, and 8,399,000 yards with an average value of 16.8 cents per yard which will be handled hydraulically.

SOUTH AUSTRALIA—*Gold and Mineral Exploration N.L.*, which holds a 1,050 square-mile lease near the northwest corner of South Australia, reports that intensive nickel mineralization has been verified. The company states that the occurrences are persistent and appear to be quite rich. This part of Australia is one of the country's most desolate, lacking good water supply and having low rainfall. Communications are practically non-existent. There is no known economic nickel deposit in Australia.

INDONESIA—The National Bank for Industry has given an interest loan of Rupees 2,250,000 to a Mr. Sugira who holds a right to explore the manganese deposits on the island of Doi, north of Halmaheira. The ore is said to be of good quality and occurs in lenses in coral limestone near the surface so open-pit mining is possible. A bulldozer has been purchased. As in India, handsorting concentration will be sufficient. Transportation from the island is a problem; ships cannot anchor because of the many holes in the limestone sea bottom—buoys will have to be placed first.

WESTERN AUSTRALIA—*Tin and Strategic Minerals Ltd.*, which is testing the Greenbushes area for tin and tantalite, has secured options over 1,965 acres held by *Goldfields Tin Syndicate*, making the total 4,400 acres. Two 8-inch suction dredging plants are producing small quantities of tin-tantalite concentrate (approximately 5 tons from 11,500 cubic yards).

LABRADOR—*Canadian Javelin, Ltd.* has discovered the existence of a 1,000,000,000 ton iron ore deposit in Labrador, according to Premier Joseph R. Smallwood of Newfoundland. The deposit is located at Wabash Lake in the southwest corner of Labrador, about 190 air miles north of Sept Iles, Quebec. The firm has already spent more than $1,000,000 on the new project in exploration work, drilling, sampling, and metallurgical research. The company plans to build a railroad line to join the deposit with the Quebec, North Shore and Labrador Railroad at a point 224 miles from tidewater terminus at Sept Iles, and hopes to begin shipping ore in the latter part of 1956.

BRITISH COLUMBIA—*Waddington Mining Corporation, Ltd.* of Vancouver has optioned the *Ferro* group of iron-bearing claims on the west coast of Vancouver Island from Russell R. Walker of Vancouver. The deposit has been traced for more than 3,000 feet. At Wasa, B.C., diamond drilling by *Estella Mines, Ltd.* has located the main Estella orebody beyond a major fault. The ore is reported to be a good grade lead-zinc.

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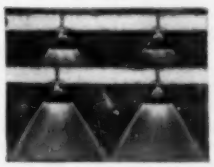

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Alaska, and to the United States Atomic Energy Commission in Washington, D.C.

BRITISH COLUMBIA—*Rexspar Uranium & Metal Mining Company, Ltd.* has started first work on the adit crosscut drive after completion of underground development preparations on its "A" orebody. A new road to the "A" zone has been completed and the adit portal cleared. To date, drilling and underground work on the firm's Black Diamond ore zone is said to have indicated a 600,000-ton uranium ore deposit open to extension westerly down dip of the structure. Underground drilling also indicated the presence of a narrower ore lens underlaying the Black Diamond deposit, but further work is required to determine its size and grade. About 110,000 tons of ore grade material has already been indicated in the A zone. Surface exploration in the area north of the fluorite zone has traced a radioactive pyrite-mica showing for a strike length of 800 feet. Four pits sunk at intervals for a strike length of 500 feet have all exposed radioactive pyrite-mica in place, with full width of the formation not exposed.

ALASKA—A ruling from the Bureau of Indian Affairs in Washington, D.C. has hampered development of the *Klukwan* iron ore deposit on the Haines Highway in Alaska by *Quebec Metallurgical Industries*. The firm has 85 placer claims and 75 lode claims under lease from the *Alaska Iron Company*. The Bureau has ruled, however, that a 320-acre block in the middle of the claims must be left for Indian berry picking and wood cutting. This site was withdrawn in 1943 by the United States Department of the Interior for school and health purposes but was never used. The site is said to be in the center of an alluvial fan of magnetite ore which Quebec Metallurgical was prepared to mine. Officials for company indicate they will drop the whole project if the 320 acres are withheld.

ONTARIO—*Geco Mines Ltd.* reports that work is well along on design and construction of a 3,300-ton-per-day concentrator, and on preparations for mine production at that rate. Immediate mining plans are to establish an adit level and to sink a 1,500-foot production shaft which will have six working levels. Production is expected by the spring of 1957. During this 1955 winter season, heavy equipment and supplies for temporary mining plant, shaft sinking, and permanent service buildings are being transported to the property.

BRITISH COLUMBIA—*Pioneer Gold Mines of B.C., Limited* reports that gold production for the second quarter of the fiscal year ended September 1954 amounted to 11,682 ounces from 24,821 tons of ore hoisted. Development work on the four new levels off No. 5 shaft continued at about the same rate as in the previous period but this second quarter slightly over 700 feet out of about 1,700 feet of development work was raising. Eleven raises in all were collared and two were completed during the period, all in ore blocks between 25 and 27 levels. A strong well-ribboned quartz vein parallel to the main vein was intersected by the exploration crosscut on 20 level east.

ONTARIO—*Teck-Hughes Gold Mines Ltd.* has formed a new firm—*Chip Mines Ltd.*—to explore and develop 46 claims in the Manitouwadge district of northwestern Ontario originally staked by *Consolidated Howey Gold Mines*. Diamond drilling is under way to test the anomalies indicated by an earlier electromagnetic survey carried out by the original owners of the property. Consolidated received 750,000 vendor shares in full payment for the claims. A part owner with Consolidated is *General Engineering Company Ltd.* which will receive a prorated portion of the shares.

SASKATCHEWAN—The *Potash Company of America, Ltd.* is reported to have brought in outstanding engineers from Europe and South Africa to discuss the most economical methods for sinking a shaft on its Canadian property. A freezing process will be used with kerosene as the refrigerant rather than brine which would have an adverse effect on ore bodies if it leaked. Core drilling has been started and shaft sinking is expected to get under way in the spring of 1955.

NORTHWEST TERRITORIES — *Northland Mines Ltd.* has secured an option on the *Sun* property, a group of 16 claims totalling about 800 acres four miles north of Marian Lake. The property was held by the Giaugue brothers who sold it for $150,000 and 300,000 shares in a new company—*Consolidated Northland Mines*—which will be formed. High-grade pitchblende has been disclosed in surface trenching, and diamond drilling will be undertaken.

BRITISH COLUMBIA—*Tofino Gold Mines, Ltd.* has taken over the *Tofino* gold mine on the west coast of Vancouver Island from *Tofino Gold Mining Company Ltd.* in a move aimed at pacing the mine in production. First step was construction of a 3½-mile road. Developed ore is estimated at 76,000 tons averaging 0.40 ounce of gold per ton. Per ton costs are expected to be around $10.00. C. W. Nash is president and E. E. Mason, consulting engineer. Paul Schutz, formerly with *Pioneer Gold Mines of B. C.*, will be mill manager.

ALASKA—The *B. C. Mica Company* of Vancouver is reported to have explored the mica deposits of Frank Blasher on Sitklan Island this summer. The island is south of Ketchikan.

BRITISH COLUMBIA — *Cowichan Copper Company* is opening an ore body in the 1,300-foot elevation adit of its mine at Lake Cowichan near Duncan. O. G. MacDonald is president.

ALASKA—After much rehabilitation work, the *Big Hurrah* gold quartz mine northeast of Nome has had to close down. Development had led almost to the point of production when serious ground movement and caving in the shaft forcing the closing of operations. Another attempt may be made to reopen it next spring.

ONTARIO—Diamond drilling has started on the 28-claim *Algoma Camp* property of *Lake Nordic Uranium* adjoining the north boundary of the Algom Nordic ore development. Drilling is under the supervision of *Technical Mine Consultants*.

BRITISH COLUMBIA—The present high price for mercury is reported to have encouraged *Bralorne Mines* to undertake new drilling on its *Takla Lake* property in the northern part of British Columbia. The mine was an active mercury producer during the war and closed down in 1944.

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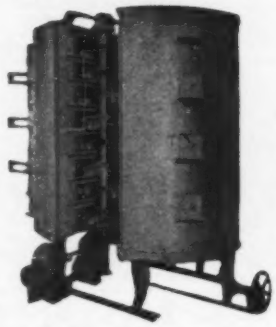

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December 21, 1954

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	Foreign Copper. Valley basis	30.00¢
LEAD:	**Common Grade.** New York	15.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton, Eagle-Picher	$187.50
ZINC:	**Prime Western;** F.o.b. E. St. Louis	11.50¢
	Prime Western; Delivered, New York	12.00¢
	Tri-State Concentrate, 60% zinc, per ton	$68.00
ALUMINUM:	**Primary 30 Pound Ingots (99% plus).** F.o.b. shipping points	22.20¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	29.00¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$1.70
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
LITHIUM:	98% (per pound)	$10.00-$13.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.75¢
MERCURY:	**Flasks.** Small lots, New York	$315.00-$320.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery, Port Colbourne, Ontario	64.50¢
TIN:	**Grade A. Brands.** New York (Price per pound) Prompt delivery	91.375¢
TITANIUM:	**99.3%** + Grade "A" (Price per pound)	$4.50
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:	**Per Ounce**	$82.00-$84.00
ZIRCONIUM:	**Sponge, Per Pound**	$10.00

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CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$45.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$31.00-$32.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$46.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.90
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$10.05
	Old Range Non Bessemer. Second quarter	$10.15
	Old Range Bessemer. Second quarter	$10.30
MANGANESE ORE:	**Swedish,** Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	22.00¢
	Metallurgical grade. 48 to 50% Mn. Long ton unit	$0.85
	Metallurgical grade. 46 to 48% Mn. Long ton unit	$0.75
	Metallurgical grade. 45 to 46% Mn. Long ton unit	$0.65
	Chemical[1] grade. 80% MnO_2. Per ton	$70.00
	Domestic U. S. Government are purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.05
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$63.00-$65.00
	Foreign. 65% WO_3 Per short ton unit (Scheelite)	$26.00-$27.00
	Foreign. South American, Spanish, Portuguese	$25.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, Moab, Hite, and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota, Riverton, Wyoming. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello, Shiprock, and Bluewater Per Pound V_2O_5	$0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois- Kentucky mines	$32.00
	Mexican. 70% f.o.b. border	$22.00
	European, Atlantic Ports, 70%	$30.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$50.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

December 21, 1954

		Per Long Ton		USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£281	10s Od	35.19¢
LEAD:	**Refined, 99.9%**	£103	5s Od	12.91¢
ZINC:	**Virgin, 98%**	£ 82	5s Od	10.28¢
ALUMINUM:	**Ingot, 99.5%**	£156	0s Od	19.50¢
ANTIMONY:	**Regulus, 99.6%**	£210	0s Od	26.25¢
TIN:	**Standard 99.75%**	£706	0s Od	88.25¢
TUNGSTEN:	**Long ton unit, 190s equivalent** to			$26.60

1. With Stering pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Wemco's Torque Flow Pump Utilizes New Principle

Western Machinery Company's new Torque-Flow pump transmits power to a pulp exactly as in a fluid type torque converter. The recessed impeller, completely out of the flow path from inlet to discharge, creates a vortex effect, causing pulp in the main pump body to rotate. The swirl produced actually develops the suction and pressure heads necessary for pumping. The pulp flow through impeller vanes, necessary in conventional solids pumps, is eliminated in Wemco's new unit. Location of the impeller out of the main flow path insures unobstructed passage of any liquid-solids combination that will pass through the piping itself. The pump will not clog. The design of the feed inlet creates little contact of solids with the impeller. The rotating fluid mass forms a buffer between the impeller and the chunks in the flow. This feature prevents excessive wear to the pump parts themselves.

The new unit has been extensively field tested in a lead-zinc mill, a southwest copper concentrator and an ore treatment plant on the Colorado Plateau. For complete details circle No. 68.

Establish Your Hard Hat Color Code For Identity

Industries that prefer metal head protection may now establish a hard hat color code with the new Bullard aluminum non-fading metallic-colored safety hats and caps. Produced with special metal dyes, both the Roughneck and "Shorty" models are available in the following six colors at no extra cost: yellow gold, bronze, blue, grey, green, and the standard, silver. More than a year of research with special dyes has gone into the development of the new aluminum color processing. For more information circle No. 46.

Rubber Hose Swallows 10 Pound Chunks of Ore

A new rubber hose, fortified with a stomach made of tough abrasion-resistant rubber, swallows ten pound chunks of iron ore and coal. Heavy chunks, up to 8 inches in length, are borne along inside the hose, carried in a stream of water at pressures as high as 250 pounds per square inch. The new hose conveys its load from mine to processing plant and through the various processing operations. It has been designed primarily for use in the mining industry.

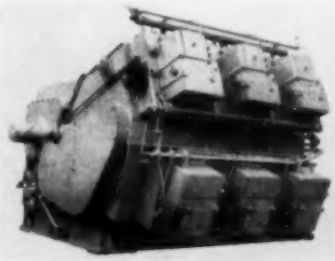
Where metal pipe is now installed to convey abrasive materials, the new hose may be used to advantage wherever the pipe system must turn a corner or negotiate a bend. Circle No. 64 for additional details.

Heavy Duty Towing Tractor For Industrial Uses

A new field tested heavy duty towing tractor with a maximum draw bar pull of 7500 pounds, designed for general purpose industrial applications, is now available from the Clark Equipment Company, Battle Creek, Michigan. Known as the Clarktor-75, the new towing tractor is equipped with an 82 hp Chrysler 6A engine with fluid coupling, planetary type drive axle, four wheel brakes, complete tire interchangeability, and one piece hinged hood. The unit features exceptional steering ease. The planetary drive axle permits maximum transmission of power to drive wheels with reduced wear in the drive train. Circle No. 75.

Mobile Drilling Unit Is Completely Self-Contained

This is a drilling rig that is providing contractors as well as mine and quarry operators with a completely self-contained mobile unit which is reportedly highly efficient. The complete outfit consists of Gardner-Denver rock drills on long feed mountings, Gardner-Denver hydraulic booms, and a complete Gardner-Denver air compressor for powering the drills, all mounted on a Caterpillar D-8 Tractor. Circle No. 61 for more information.



New V-6 Diesel Features Simplicity Of Design

A new compact V-6 horizontal Diesel engine featuring greater simplicity of design and construction is now made by Page Engineering Company of Chicago. Built especially to provide dependable power to the load and hoist drums of Page Walking Draglines, this Page V-6 engine also features a short, rigid crankshaft as well as horizontal piston travel. Its horizontal design gives quick access to all major part of the engine from above, reducing inspection and maintenance time. Circle No. 52.

New Replaceable Blade Insert Bit Announced

A new insert rock bit designed to improve the efficiency of rotary drilling in minerals exploration has been developed by Herb J. Hawthorne, Inc., Houston, Texas. The new bit has undergone extensive field and laboratory testing.

The Hawthorne Insert Rock Bit is made of tough tool steel and utilizes a tungsten carbide insert on the cutting surfaces. It is said that the high toughness of these inserts minimizes breakage and a special welding process developed by Hawthorne prevents loosening of the inserts while drilling. For details circle No. 62.

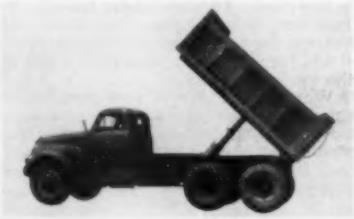
12-Yard Tower Excavator Believed to be Largest

This tower machine is believed to be the largest single excavating unit ever made for sand and gravel operations. The machine handles 450-cubic yards per hour on an average haul of 300-feet for a West Coast supplier. Its maximum length of span is over 600-feet.

The Crescent scraper bucket delivers 12-cubic yards of material to the hopper on each trip. It works between a 90-foot head tower which moves on rails at the floor of the pit and a 50-foot tail tower traveling the top of the 240-foot high bank. For information contact Sauerman Bros. Inc., 522 S. Clinton St., Department M-33, Chicago 7, Illinois or circle No. 66.

Caterpillar Offers New Four-Wheel Tractor

A new 150-horsepower four-wheel tractor has been announced by Caterpillar Tractor Co. The new tractor, the DW15, is powered by a Cat six cylinder D326 Diesel Engine. A standard transmission gives double speed ranges, with 10 forward speeds up to 24 miles per hour and two reverse speeds up to 3.3 mph. Optional final drive gears make possible speeds up to 31.3 mph. Wheelbase dimension on the DW15 is 121½ inches. Front tire sizes are 12 by 20, 14-ply traction type. Rear tires are 21.00 by 25, 20-ply rock type. Overall length of the new tractor is 16 feet 8 inches. The DW15 was designed principally for use with the Cat No. 15 Scraper, No. 10 Scraper and W10 Wagon. Circle No. 69.



Larger Payloads With New Dump Body

A new dump body-hydraulic hoist combination, which is reputed to carry up to 1,000 pounds more payload than most units of similar size, is announced by The Galion Allsteel Body Company, Galion, Ohio. Designated as Allsteel Body No. 12N-5 with Hoist No. 77353, the combination is especially advantageous for use in areas where strict weight laws are now in effect. The dump body may be constructed of 10-gauge high resistance steel or 12-gauge high tensile steel, in accordance with the customer's preference. Bodies are available in lengths to 14-feet and capacities to 12-yards. For more data circle No. 51.

Honeywell Opens Product Research Center in Denver

A new research and product development center has been opened in Denver, Colorado by MICRO SWITCH, a division of Minneapolis-Honeywell Regulator Company, it was announced recently by W. W. Gilmore, president of the division.

The new center, located at 387 Corona Street, will supplement research activities conducted at the division's main office and factory in Freeport, Illinois. Wilbert Martin, assistant director of product research and development will be in charge of the new facility. About ten engineers and technicians will be employed.

Notes From The Manufacturers

James Buset, who managed the St. Paul, Minnesota parts depot for Caterpillar Tractor Company for three years, has been named manager of a new depot in Los Angeles, California. The new California station will provide emergency overnight service to its distributors in southern California, southern Nevada, and Arizona.

Edwin S. Ladley has been appointed director of purchases for Hercules Powder Company, Wilmington, Delaware. He succeeds *Lawrence J. Finnan, Jr.*, who retired at the end of December.

A. H. Jones, formerly vice president in charge of the export division of Gardner-Denver Company, New York City, has been named vice president and director of export sales for the company. *Norman Nevin*, formerly district manager of the Gardner-Denver office in Lima, Peru, is now manager of the export offices in New York City. New district manager of the Lima office is *John H. Mastrovich*, a member of the Peru staff since 1946.

Franklin H. Drew, steam superintendent for the Pacific Coast, has been named to fill the new position of Pacific Coast service manager for the Westinghouse Electric Corporation. Other promotions at Westinghouse include *J. N. Jones*, electrical superintendent on the Pacific Coast, who has been appointed engineering and service manager for the Salt Lake City, Utah, office and *Edward H. Hulse*, formerly at Salt Lake City, who is now mining, petroleum and chemical section manager in the industry engineering department at East Pittsburgh, Pennsylvania.

Reuel E. Warriner, in charge of sales to the steel industry for the International Nickel Company, Inc., has been appointed vice president, sales, for the Climax Molybdenum Company. Mr. Warriner has been in charge of the steel section of International Nickel's nickel sales department since 1943. He assumed his Climax post November 1.

Robert O. Dehlendorf, who used to be district sales manager for motors for Jack & Heintz, Inc. in New York, has been appointed assistant general sales manager of the Electric Motor Division of A. O. Smith Corporation with headquarters at Dayton, Ohio. Mr. Dehlendorf has been with the company's Chicago office for four years.

George L. Staudt, advertising manager of Harnischfeger Corporation, Milwaukee, Wisconsin, was elected chairman of the board of the National Industrial Advertisers Association at its annual conference in Montreal, Canada.

SELECTION OF SPEED REDUCERS: Shaft mounted speed reducers offering the advantages possible with double-enveloping worm gearing are detailed in Bulletin CD-323 available from Cone-Drive Gears Div., Michigan Tool Co., 7171 E. McNichols Road, Detroit 12. How Cone-Drive shaft mounted reducers can be motorized and engineering details necessary for selecting the right reducers are described. For your copy circle No. 13.

NEW RESPIRATOR: A new chemical cartridge respirator with an "All-Vision" facepiece is described in a bulletin recently published by Mine Safety Appliances Company of Pittsburgh, Pa. It is said to be ideal for use in atmospheres which are ordinarily uncomfortable or toxic after long exposure. Circle No. 14 for bulletin No. 1007-S.

BELT CONVEYOR IDLER: The Joy Manufacturing Company announces a flexible, 2-bearing, belt conveyor idler which reportedly cushions and shapes itself to the load. Literature describes the item as a cable-suspension idler which provides a load conforming catenary. For more information on the Limberoller circle No. 39.

SCRAPER OPERATIONS: Materials handling operations are discussed and described in two field reports SND-205 and SND-224, prepared by Sauerman Bros., Inc. Handling ilmenite ore with a drag scraper is covered in SND-224, while SND-205 describes the handling of fill at the shaft collar of a Canadian mine. No. 78.

CORE DRILLING: The Joy 22HD core drill, a rugged, heavy duty machine, is rated at 1750 feet capacity with "E" rods. The portability of the unit should be of interest to those conducting exploration campaigns. Get more information by filling in No. 74 on your card.

ROTARY FEEDERS: Beaumont Birch Company, Philadelphia, Pa. have developed a completely sealed Rotary Feeder for pressure or vacuum feed. The standard unit employs brass half seals for normal feed. Circle No. 29 for details.

SEISMIC SYSTEM: A complete seismic system with exceptionally wide dynamic range has been announced by Houston Technical Laboratories. HTL reports that the Model 7000 Seismic Amplifier System is specifically designed for magnetic recording as well as conventional seismic applications. Circle No. 9.

DIESEL FUEL SYSTEM: The PT fuel system developed recently by the Cummins Engine Company is said to contain far fewer and simpler parts than carburetor and ignition systems or ordinary Diesel fuel systems. A simple device meters fuel through a fixed orifice according to the amount of pressure on the fuel. For details circle No. 47.

MAGNETIC SEPARATORS: The highlights of Dings' Magnetic Separators are found in bulletin B-1500. Copies of this bulletin are available from the company at 4719 W. Electric Ave., Milwaukee, Wis., or by circling No. 48.

PORTABLE HEAT: The Silent Glow Oil Burner Corp. offers eight models of portable heaters, either the radiant type or forced air type. These units are ideal for cold weather operations when you need heat in a hurry. Circle No. 49 for information.

NEW HARDFACING PROCESS: Stoody Magnecote is a new method for making high speed weld deposits for metal build-up or hardfacing. It is said to possess all the flexibility of manual welding with greater speed than automatic welding. Circle No. 50 for complete information.

HEAVY MEDIA SEPARATION: Complete details and information on Western Machinery Company's Mobil-Mills are contained in bulletin M-3-M-5. These heavy media separation plants are in operation throughout the world. Circle No. 71.

NEW 4 IN 1 BUCKET: Now available on International 6 and 9 series crawler tractors is a new bucket attachment which enables you to do a variety of jobs with one attachment. A bucket control lever allows the unit to act as a bulldozer, bullclam, skid-shovel or clamshell. Obtain complete details by circling No. 70.

HMS SEPARATORY VESSEL: The Ore & Chemical Corporation's new HMS vessel features improved removal of the sink product according to a brochure released by the company. The unit is made in 6 basic designs ranging in capacity up to 400-tons-per-hour. Circle No. 53 for details.

PROSPECTOR'S HAND DRILL: Kennametal Inc. has developed a solid-head, carbide-tipped hand drill for prospectors. It is said that the single jack drill stays sharp 50 to 100 times longer. Circle No. 43 for prices and details.

NEW GEIGER COUNTERS: The Nucleonic Company of America, Brooklyn, N. Y., manufacturers of Radioactive Laboratory Instumentation, is now offering a complete line of geiger counters selling from $24.95 to $149.50. For descriptive material circle No. 1.

IMPROVED CYCLONE DESIGN: A 12-page catalog released by Equipment Engineers, Inc. of San Francisco illustrates four basic model cyclones and describes new features of molded pure gum replacable lining. The catalog includes data on the integral two stage cylindrical design. For a copy of Bulletin 121 circle No. 2.

MAGNETIC SWEEPER: Storage yards, parking lots and other large open areas can be quickly and effectively cleared of all ferrous metal pieces with the new PFH Permanent Magnet Sweeper added to the line of F. W. Shrader Company, Culver City, California. This unit is mounted on heavy duty wheels and can either be pushed by hand or towed. Circle No. 3 for full details.

FLUID COUPLINGS: Bulletin, No. 144-D, released by Twin Disc Clutch Company, gives complete installation and performance data on fluid couplings. Complete diagrams and drawings show how Twin Disc Fluid Couplings are applied to equipment powered by electric motors or internal combustion engines from ¾ to 850 horsepower. Circle No. 54.

"50 YEARS ON TRACKS," a 104-page book, contains the story of the Caterpillar Tractor Company. This is another addition to the rapidly growing library of corporate histories. Sixty percent of the book covers Caterpillar Tractor's history, the remainder presents the manufacturer as it stands today. Copies are available through most Caterpillar dealers for $1.25. Circle No. 55.

DRAWPOINT LOADING: The Eimco Corporation has published a number of job stories describing mechanical drawpoint loading at various properties. For your copy write the company requesting Bulletins L1017A, B, and C or circle No. 45.

STOP CONTROL: Allis-Chalmers reports that the new automatic stop control for vibrating equipment replaces mechanical snubbing with smooth electrical braking action. For details circle No. 21.

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NEW TAPE RULE: The Lufkin Rule Company has added a new tape-rule with a white blade to their line of measuring tapes and rules. The blade is finished in pure white with bold black figures and black graduations. Circle No. 35 for prices and specifications.

MAGNETIC FLOW METER: The Foxboro Company has designed a new electromagnetic flow meter for 2 to 8-inch diameter pipe lines. It measures the volume flow rate of any liquid of sufficient conductance and velocity. It is unaffected by the pressure, viscosity, density or changes in conductivity of the flowing liquid. Circle No. 36 for more information.

HARD-SURFACE ALLOY: All-State Welding Alloys Co., Inc. announces a new hard-surfacing alloy which work-hardens after it is applied. The electrode, an alloy of chromium, manganese, and nickel, is applicable with AC or DC welders, and deposits reach a hardness of 48 to 50 Rockwell C. Details will be forthcoming by circling No. 37.

NEW HAULAGE UNIT: Athey Products Corporation has published a catalog on their new PR 21, 22.5 cubic yard rear dump unit. Specifications are included. Circle No. 38.

COOLING SYSTEMS: Another service bulletin, published by Cummins Engine Company, highlights the importance of the cooling system in internal combustion engines. Copies can be obtained from the company at Columbus, Indiana or by circling No. 56.

DUMP BODIES & HOISTS: Galion Allsteel Model 12N-4 bodies and several hydraulic hoist models are described in a 4-page bulletin just released by the Galion Allsteel Company. Simplified sketches illustrate the advantages offered. Circle No. 40 for a copy of Bulletin L-9828.

NICKEL-IRON BATTERY: Edison Storage Battery Division of Thomas A. Edison, Inc., now offers a nickel-iron battery which is said to give 25 percent more power with approximately the same space as its predecessor battery. For information on the applications of the battery circle No. 41.

HARD-FACING DATA SHEET: An 8½ by 11-inch engineering data sheet describing special properties of Colmonoy hard-facing alloys is now available from Wall Colmonoy Corp., 19345 John R Street, Detroit, Michigan. Circle No. 42.

HYSTER LIFT TRUCK: The new Hyster RC-150 Model, 15,000-pound capacity lift truck, is described in a 16-page brochure now available. In action photographs, descriptive data and specifications on the model are given. Circle No. 15 for your copy.

TORQUE-FLOW PUMP: A new principle of dynamic solids pumping is utilized in Western Machinery Company's new sand pump. The difference is the recessed impeller which eliminates clogging and establishes a new low for wear on pump parts. For complete details on this new pump circle No. 59.

PORTABLE GRIPHOIST: Griphoist, Inc. has designed and is marketing a manually operated, portable hoisting or pulling device. The new unit does the work of winches, winch trucks, chain hoists and rachet hoists. For more information circle No. 17.

PROTECTIVE HEADGEAR: A new Skullgard Eyeshield, designed for convenient cap-mounting on all types of MSA Skullgard protective headgear, has been announced by Mine Safety Appliances Company, Pittsburgh, Pa. The device, made of plastic, deflects flying particles which are hazardous to workers' eyes. Circle No. 18 for more information.

INSTRUMENTATION DATA: Fischer & Porter Company has released a 12-page catalog with illustrations, descriptions, and basic specifications on instrumentation for measuring and controlling process variables. Flow meters, density, temperature, liquid level and viscosity controls are covered. Circle No. 19 for your copy.

HEAVY DUTY CHAIN: A bulletin describing the various types of Tisco Manganese Steel Chain has been issued by Taylor-Wharton Iron and Steel Company. The heavy duty chain finds application for conveyors, elevators, drives, etc. where a combination of impact and abrasion are encountered. Free copies can be obtained by circling No. 20.

TRAMP IRON DETECTOR: A simple, inexpensive and reliable means for detecting tramp iron and steel on conveyor belts has been developed by Industrial Physics and Electronics Co. Known as Detramp, it consists of a sensing unit placed around or under the belt at any desired point. An amplifier-detector unit actuates warning devices or stops the belt. For complete details circle No. 31.

THERMO-DECK HEATING UNIT: The Allis-Chalmers Manufacturing Co. reports that you can screen fine, moist material continuously with a Thermo-Deck heating unit. No down time is required to clear fine or medium mesh screen cloth. Complete information is contained in bulletin 07B7812. Circle No. 46.

MAGNETORQUE EXPLAINED: An entirely new bulletin giving the A to Z story of Magnetorque hoist drive for P & H shovels has just been published by Harnischfeger Corporation, Milwaukee. Free copies of bulletin No. X-156 may be obtained from the company at 4606 West National Avenue, Milwaukee 46 or by circling No. 4.

DEEP HOLE DRILL: A new deep hole percussion drill with a hammer diameter of 4½-inches has just been announced by Gardner-Denver Company. It is reported that the new model provides increased drilling speed and power for long holes and larger diameter holes. Circle No. 5 for details.

NEW METAL ALLOY suitable for dry bearing, precision casting and fluxless welding has been developed by Chemalloy Associates of Santee, California.

CHEMALLOY is said to defy rust, resist corrosion, work without lubricants in moving machines or parts. For information circle No. 6.

PORTABLE RECTIFIERS: The first completely portable air-cooled mercury rectifier ever available to the mining industry has been announced by Clark Electronic Laboratories of Palm Springs, California. Transformers are contained in the same case. Circle No. 7 for literature.

UNDERGROUND CONVEYOR: A completely new underground belt conveyor for coal and metal mines has been announced by The Jeffrey Mfg. Co., Columbus, Ohio. The conveyor is designed for heavy duty and high tonnage in mines where the main haulage system is a semi-permanent installation. For further information circle No. 8.

PORTABLE ROTARY DRILL: The Seismograph Service Corporation has developed a light-weight rotary drilling rig suitable for uranium prospecting in areas inaccessible to truck-mounted equipment. Total weight is about 800 pounds including standard A Type rods. It can quickly be disassembled into components weighing no more than 100 pounds. Circle No. 57.

For Free Product Literature see other side

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New Electro Metallurgical Titanium Plant Is Latest Development in Growing U. S. Output

Electro Metallurgical Company, subsidiary of Union Carbide and Carbon Corporation, has awarded design and engineering contracts for its $31,500,000 titanium sponge production facilities to be built at Ashtabula, Ohio. Catalytic Construction Company, Philadelphia, Pennsylvania, has already begun preliminary work on the plant which will use a new electromet process. This may be sodium reduction of titanium chloride rather than the magnesium reduction in Kroll process now exclusively used in commercial titanium production.

Construction of the Ashtabula plant, which is expected to be the nation's largest titanium facility, is one of the latest developments resulting from the government's expanded titanium program. The Office of Defense Mobilization late in August set up a new goal calling for construction of facilities to process 37,000 tons of titanium ingots a year by the end of 1956. In announcing the new quotas ODM has set up rapid tax write-off allowances to companies that build such capacity by the deadline. This latest order is actually the third step in the government's expanded titanium program. Earlier announced goals were: 25,000 tons of titanium sponge production capacity, and 37,500 tons of annual titanium ingot melting capacity.

The Electro-Metallurgical plant will be completely financed with company funds and is expected to produce at least 75,000 tons of titanium metal per year. The General Services Administration has agreed to purchase at prevailing market prices any part of the plant's output not sold to private industry within the next five years.

Other titanium developments announced by United States firms in the past few months include the following:

A large titanium dioxide and sulphuric acid plant will be constructed by the Glidden Company at Baltimore, Maryland. The firm is constructing a pilot plant at nearby Sparrows Point to make titanium metal by a new electrolytic process, with which the firm hopes to cut production costs sufficiently to warrant large-scale industrial use of the metal.

Rem-Cru Titanium, Inc. has been granted a certificate of necessity for producing titanium and titanium alloy products in the amount of $12,775,000. The certificate was granted because the plant is located in a critical labor area. The expansion will increase the firm's capacity at its Midland, Pennsylvania operation from 2,500 tons a year to 11,150. Rem-Cru has been purchasing its sponge, from which titanium ingots are made, from E. I. du Pont de Nemours & Company. Du Pont controls Remington Arms Company, partial owner of Rem-Cru.

Dow Chemical Company, Midland, Michigan, has signed a GSA contract to increase its capacity by 1,800 tons of titanium sponge a year.

Horizons Titanium Corporation and Western Pyromet Company also have titanium contracts with GSA.

Penn. Railroad Increases Ore Handling Facilities

The Pennsylvania Railroad will increase the ore handling capacity of its ore pier at Greenwich Point in Philadelphia, Pennsylvania with the addition of another unloading machine capable of handling up to 25 tons of ore at a time.

Formally dedicated in August 1954 when the first shipload of Canadian ore was delivered from the rich Quebec-Labrador fields by the Iron Ore Company of Canada, the $10,000,000 pier already has two unloaders. Installation of the third by the Dravo Corporation will increase the pier's handling capacity to make it one of the largest iron ore handling facilities on the east coast. In addition to the Canadian ore, it is expected that ore from South America will also be received here.

Battelle To Expand Its Nuclear Research Program

Plans for a $1,535,000 expansion of its nuclear-energy research facilities have been announced by Battelle Institute at Columbus, Ohio.

The new facilities will be used for enlargement of the Institute's contract research for industry and government in the atomic-energy field. They are in addition to present facilities available for nuclear research, in which the Institute has $2,000,000 invested.

All funds for the expansion program already have been appropriated by the Institute's board of trustees, according to Dr. Clyde Williams, Battelle president and director. Construction of a nuclear reactor, a reactor development laboratory, and a nuclear fuels laboratory is scheduled to begin about the first of the year. The laboratories will be constructed on a 397-acre tract of land near West Jefferson, Ohio, 15 miles west of downtown Columbus.

Plans also call for the installation of a large cobalt-60 source.

Utah Construction Company has completed sinking of the main shaft and the 12-foot circular ventilator shaft 4,000 feet away, at *New Jersey Zinc Company's* property located one mile south of Jefferson City, Tennessee, on the Dandridge Highway. Crosscutting between shafts is now under way.

The *Tungsten Mining Corporation* is moving ahead on design of its new chemical plant at Henderson, North Carolina. The plant will process a dust recovered from tungsten operations at the company's *Hamme* mine, and will make this dust into a saleable product.

Carolina Mines, Inc. has been incorporated at Kings Mountain, North Carolina, with an authorized capital of $1,000,000, by J. E. Herndon and J. J. Mullinax of Kings Mountain, and A. S. McCulloch of Vancouver, British Columbia. The firm is primarily interested in mining of kyanite, and holds property and mineral rights in Gaston County where it is now core drilling and prospecting.

Officials representing the domestic fluorspar producers of southern Illinois and western Kentucky have been in Washington, D.C. discussing the current domestic fluorspar problems. They appeared before the Office of Defense Mobilization on stockpiling of domestic metallurgical fluorspar, before the United States Tariff Commission on its inquiry into the impact of foreign imports on the domestic fluorspar markets, and before the Committee on Reciprocity Information (State Department) urging that the concession on acid-grade fluorspar made by the General Agreements on Tariff and Trade (June 1951) reducing acid-grade fluorspar import duty from $5.60 per long ton to $2.10 per long ton

American Zinc Sinking New Shaft in Tennessee

American Zinc Company of Tennessee is sinking its new Coy shaft (G on map above) southeast of Jefferson City, Tennessee. The shaft is expected to be completed and in production by the early part of next year. In the area south of North Friends Station (C) and west of the Grasselli mine (D), the company is exploring an area of approximately 7,700 acres under an exploration contract with the Defense Minerals Exploration Administration. The property is under option to purchase either the mineral right or the fee. The project will run for a period of two years and covers drilling of a total of approximately 450,000 feet. Cost of exploration is being shared equally by the company and the government. If the project is successful and commercial minerals are brought into production, the company will repay the government the full amount of its advance without any interest, on a sliding scale royalty basis not in excess of 5 percent of the value of production. Repayment may extend over a period of 30 years. Ten diamond drills are now operating in the area and results to date are reported to be encouraging.

be eliminated and the statutory rate of $5.60 be restored. Some of the men also met with the Illinois Central Railroad officials in Chicago to argue for lower freight rates on fluorspar. This aid would help them to equalize their competitive situation with foreign imports, they believe.

The $3,000,000 mine and plant under construction by *Humphreys Gold Corporation* for the *E. I. duPont de Nemours and Company* near Lawtey, Florida is expected to start producing ilmenite shortly. Output when in full operation will be about 100,000 tons a year. Known as the Highland plant, it will be similar to the 20,000-ton-per-day plant at Trail Ridge, near Starke, Florida.

Paul and Tom Patton of the firm of *James W. Patton and Sons* are currently in Shoals, Indiana under contract to the *United States Gypsum Company*. They are sinking two vertical shafts and will drive two drifts for a gypsum mine which the company plans to open. One shaft will be 6 by 9 feet, and the other 10½ by 12 feet. Both will be sunk a distance of about 450 feet. The drifts will be each about 800 feet long.

The United States Department of Commerce Office of Technical Services has published a 26-page listing of government titanium research reports now available to industry. More than 300 research reports are described and priced in the volume. It is intended to help industry keep abreast of the latest titanium technology advances. The volume may be purchased from the Office of Technical Services, U.S. Department of Commerce, Room 6227, Washington 25, D.C. for 50 cents.

IRON RANGES

The *W. S. Moore Company* has completed plans to start stripping a new property—the O'Brien just west of Nashwauk, Minnesota. The new mine is expected to be in production in the spring of 1956.

Oliver Iron Mining Division of the *United States Steel Corporation* is planning on returning all operations to a five-day week this month, according to R. P. Elstad, Oliver Iron Mining Division president. At present many of Oliver's operations are on a four-day schedule.

An important step in the construction of the Reserve Mining Company's taconite plant at Silver Bay, Minnesota was taken recently when the power line to the project was energized. This 75-mile line built at a cost of more than $2,000,000 will supply electricity requirements for the townsite and standby power for the plant itself. It will be inter-connected with Reserve's new power plant and will serve to transfer power to the mining operations at Babbitt.

Total shipments of Lake Superior iron ore through November 21 as reported by the Lake Superior Iron Ore Association were 60,421,470 gross tons. This compares with 95,709,818 tons shipped during the same period in 1953.

Following the removal of 9,800,000 tons of ore, the *Sibley* iron mine near Ely, Minnesota is to be closed. The *Oliver Iron Mining Division* of the *United States Steel Corporation*, operator since the first shipment in 1899, reports that the ore body is depleted. The company has given notice of cancellation of its lease effective April 1, 1955. The Sibley is located between the *Zenith* and *Savoy* iron ore properties.

The *Balkan Mining Company* (*Pickands Mather & Co.*, operating agents) has served a legal writ on the board of commissioners of Itasca County, Minnesota asking the vacating of the road from Bovey to Taconite in 90 days. The mining firm based its action on the old agreement when the road right-of-way was opened. The *Danube* open-pit iron mine has been extended from year to year until it is now right up to the edge of the road. In order to expand its mining operations, Balkan must have the road closed.

The *Bethlehem-Cuba Iron Mines Company* of Wakefield, Michigan received a certificate of necessity in the amount of $438,000 for iron ore facilities, with 65 percent allowed for accelerated tax amortization.

North Range Mining Company has taken over the *Penokee* iron mine at Ironwood, Michigan from the *Republic Steel Corporation*. Most of the former Republic employees at the operation have been retained.

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DMEA OK's Million Dollar Exploration Project

Second largest DMEA exploration contract in the Pacific Northwest is being undertaken by Hecla Mining Company of Wallace, Idaho at the Silver Mountain Lead Mines' property east of Mullan in the Coeur d'Alene mining district of Shoshone County, Idaho.

The contract calls for expenditure of $1,058,366 (half to be put up by the government agency) in a search for lead, zinc, and copper at depth. Plans call for a 2,000-foot shaft, 7,500 to 8,000 feet of laterals, and some 20,000 feet of diamond drilling. The project is to be concluded by January 1, 1958.

Bunker Hill & Sullivan Mining and Concentrating Company of Kellogg is a partner with Hecla in an operating agreement with Silver Mountain Lead. Bunker Hill currently is carrying out the largest Defense Minerals Exploration Administration program in the Northwest—a $1,098,750 below-sea-level exploration of the old Crescent mine just west of the Sunshine mine.

The Silver Mountain property is a consolidation of the old Idaho Silver, Little Jim, Snowstorm, O'Brien Gulch, and Coughlin groups of claims, effected in 1952.

At the Vindicator shaft project east of Mullan, Shoshone County, workmen are preparing to crosscut at the 750-foot point in a new shaft sunk under a $229,500 exploration contract with the Defense Minerals Exploration Administration. *Silver Buckle Mining Company* of Wallace, and *New Park Mining Company* of Salt Lake City, are doing the work under a profit-sharing agreement with *Vindicator Silver-Lead Mining Company*. Final shaft rounds disclosed encouraging copper-lead-silver mineralization.

A vein-type uranium deposit is being explored at the property of *Hailey Trust*, Blaine County, west of Hailey, Idaho. The operating company, *Hardee Exploration Company* of Casper, Wyoming has completed a 120-foot incline shaft near an old shaft put down in gold rush days. The dump of the old shaft, which could not be reopened, showed radioactivity.

The main shaft at the *Sidney Mining Company* property in the Pine Creek district of the Coeur d'Alene mining region, Shoshone County, Idaho is being deepened at a rate of 60 feet a month. At last report, the shaft was down about 50 feet below the 1,700 level sump. The two-compartment shaft will be deepened to the 2,300 level, from which an extensive exploration program will be undertaken under a $323,150 DMEA contract. Current production is 2800 tons monthly, of which block leasers provide about 75 percent. M. C. Brown of Kellogg is president.

A $16,000 uranium exploration project at the *Surprise* group of mining claims in the Dahlonega district, Lemhi County, Idaho has been approved by the Defense Minerals Exploration Administration. Government participation will be 75 percent. Work will consist of underground drifting, crosscutting, and raising. I. J. Wilhite and Arthur V. Seay, Jr. of Birmarck, North Dakota, are carrying on the operation.

A vein of silver-lead ore has been intersected by *North Fork Mining Company* in a $44,500 DMEA project at its leased, six-claim *Lucky Strike* property near Kings Pass, Beaver mining district, north of Wallace, Shoshone County, Idaho. The strike was made at the 300-foot point in a proposed 500-foot crosscut being driven under surface showings exposed by bulldozer. Down-hole diamond drilling is planned from a station to be cut near the end of the tunnel. Robert A. Rice, Osburn contractor, is doing the work under direction of R. H. Scanlin, Port Angeles, Washington general manager.

In Lake Gulch west of Wallace, Idaho *American Smelting & Refining Company*, at last report, was putting finishing touches on facilities to expand capacity of its Galena mill to 350 tons daily. The mill will handle production from the leased *Vulcan Silver-Lead* property. J. E. Berg, Wallace, is manager of the firm's Northwest mining department.

Uranium Exploration Company of Wallace, Shoshone County, Idaho has changed its name to *Uranium Discovery and Development Company*.

Radon Uranium, Inc. of Kellogg, Idaho was incorporated by Wayne A. Brainard, P. J. Holtz, and C. Whalen, all of Kellogg, Shohone County. They listed capital stock of $2,000,000.

Bitterroot Uranium Company of Salmon, Lemhi County, Idaho has been incorporated by Carl A. Person, George E. Summers Jr., John J. Gunness, Arthur V. Seay Jr., and Irvin J. Wilhite, all of Bismarck, North Dakota. Capitalization was listed at $300,000.

Copper Hill Mining Company of Jerome, Idaho has been incorporated with capitalization of $1,000 by Louise M. Lindsey and John Lindsey, Jerome and John Owen and Gabriel G. Rubin, Pittsburgh, Pennsylvania.

Golconda Lead Mines has opened 100 feet of good lead-zinc ore on the 1,600-foot level of its mine east of Wallace, Idaho. The level was reopened to gain access to an area where old maps indicated mineable ore was left by early-day operators. A raise is being driven in the ore to the 1,400 level. Current production is 30 to 35 tons daily. Wray Featherstone, Wallace, is mine manager.

The *Silver Syndicate* mine on Big Creek, Shoeshone County, Idaho, being developed upward from the 3,840 level of the adjoining *Sunshine* mine, now is being explored at the 2,700 level by *Sunshine Mining Company*. The present highest producing level is the 3,100. Current production is about 3,000 tons monthly. Norman M. Smith is directing engineer for *Silver Syndicate, Inc.*, and W. M. Yeaman of Yakima is president.

United Uranium Company is having its 1,000 acres of leased property in the Rock Creek area about 12 miles southeast of Hailey, Idaho investigated by a Spokane geologist, J. W. Melrose. Following his report, the firm will decide whether to undertake an aggressive development program.

Royalties and Minerals, Inc. has been incorporated for $1,000,000 at Boise,

Highland-Surprise Drills Under This Surface Cut

Surface reconnaissance and diamond drilling have disclosed several parallel zinc-lead vein structures with good possibilities for commercial production on the leased property of Highland-Surprise Consolidated Mining Company in Fourth of July Canyon, near Stanley, Custer County, Idaho. Exploration was undertaken in September 1954 with extensive geological mapping, bulldozing, and sampling of outcropping, after inspection of the trench (shown above) opened on the main vein by previous operators. Three surface holes were drilled at a 45-degree angle to a depth of about 300 feet before work had to be suspended for the winter. Results were substantially encouraging and negotiations are now under way with the Spokane office of the Defense Minerals Exploration Administration for an exploration loan with which to continue the project. Highland-Surprise has a purchase option of the property, and has also acquired leases with option to purchase on two independent properties south and east of this group; adjoining ground and a mill site have also been staked.

Idaho by T. A. Eberle, Charlotte M. Pehlke, Alice Harmon, and Rae Jean Doherty.

Among the firms recently incorporated in Idaho are *Western Ore Reduction Company* at Hailey by Fred H. and Earl W. Shirts of Hailey, Allen E. Mecham, Royden G. Derrick, and Horace A. Christiansen, all of Salt Lake City; *Camas Uranium Mining and Development Company* at Fairfield by Sterling W. Stokes and Donald Vaught of Fairfield and Lowell Fields of Gooding.

Uramco, with capital stock of $300,000, has been incorporated at Boise, Idaho by William H. Baxter and Lee R. Cannon, Boise; Clarence A. Dye, Grand Junction, Colorado, and Robert M. Robson, Grangeville.

MONTANA

Golden Anchor Mining and Milling Company is installing a new type of concentrator at its gold-silver-lead property on Treasure Mountain, nine miles south of Elliston, Montana. Invented by B. J. Pugh, veteran Helena mill man, it combines action of a stamp mill and the Spanish arrastra. Four wedge-shaped shoes, weighing 400 pounds each, rotate over four similar stationary shoes. Capacity is two to five tons of ore hourly. The mill structure is scheduled for completion in time to permit production in the spring. An estimated 20,000 to 30,000 tons of ore has been blocked out on two levels and some 12,000 tons of dump ore is ready for milling. The firm has withdrawn from a $35,000 DMEA exploration contract after doing $13,200 worth of work. Henry L. Newmiller of Spokane is president; Mrs. Helen N. Newmiller is secretary-treasurer.

The *Mitchell Mining Company*, Walkerville, Montana has converted the operation of the *Marget-Ann* mine to a block-leasing system of mining to expedite the development of the property. The miners lease a certain portion of the underground workings and proceed to mine the ore on a royalty basis. The company is also crosscutting and drifting on the new 550 level to open the veins at a lower depth.

Taylor-Knapp Company has succeeded in putting down a deep well, turbine-type, pump to dewater the lower part of the True Fissure shaft which is located near Philipsburg, Montana. The pump was lowered with a minimum of trouble and the dewatering program is progressing at a much faster rate than the original plans anticipated.

Carl LoConto of Boise, Idaho and Roy Walton of Bozeman, Montana believe they have found uranium-bearing ore 14 miles southwest of Bozeman in Gallatin County. Mr. Walton, original owner of the claims, sold them to Mr. LoConto a year ago, and the latter has been mining vermiculite on the property. Reportedly, Mr. Walton made the radioactive ore discovery.

Treasure State Uranium Corporation has been formed to develop the *White Pine* uranium property six miles east of Alhambra, Jefferson County, Montana. Incorporators are R. A. Buzzard, George Hoffman, S. J. Burgess and Gustaf Carlson, all of Helena, and Earl T. Ellis of Maxville. Capital is $500,000.

Northern Mining Company of Zortman, Phillips County, Montana has been incorporated with capital of $50,000 by Paul I. Raber, Loren Anderson, John Meisner, Charles Beck and P. M. Schultz, all of Bismarck, North Dakota, Martin Sullivan, Carpico, North Dakota, and George Setzer, Malta.

R. E. Johnson of Sheridan, Wyoming, William D. McDonald of Belgrade, Montana and R. B. Farnsworth of Bozeman have organized *Barabi Development Company*, with capitalization of $100,000.

Radioactive ore found on dumps of the old *Gray Eagle* and *Comet* mines in the Basin mining district, Jefferson County, Montana, have encouraged R. H. Mills of Spokane, Washington to reopen the Gray Eagle workings. Geiger counters were used to sort a shipment of uranium ore from dump waste.

Now Mining Company, Inc. of West Yellowstone, Gallatin County, Montana has been incorporated by Arnold K. Clawson, William B. Whetstone and Eugene W. Cheatley, with capital stock of $50,000.

Spar Mining Company has been incorporated by Elmer Voth and Chester

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Johnson of Ronan, Montana and Jack Sheldon, Missoula, with capitalization of $100,000.

The old *August* and *Little Ben* mines near Landusky, Montana are being reopened by a new firm, the *Little Rocky Mt. Mining and Development Company*. Organizers of the company are Frank B. Bryant, Edward Wieglenda, Marian and Juanita Heller, and Cecil Flinders. Mr. Bryant reports that they have discovered a virgin ore body and will proceed with development work. The original August mine, later called the Little Ben, reportedly produced $6,000,000 in gold.

OREGON

Interest in central Oregon's Ochoco quicksilver district is picking up because of the record-high price of mercury. Most of the deposits being worked are within 35 miles of Prineville. Large areas of promise have not been explored for quicksilver.

The Albany, Oregon office of the Bureau of Mines will remain as regional headquarters for Oregon, Washington, Idaho and Montana, and Alaska has been brought under its administrative control. Interior Secretary Douglas McKay overruled an Interior Department survey team which had recommended that the Albany headquarters be closed and that Pacific Coast operations be directed from Reno, Nevada. Stephen M. Shelton was reappointed director of the Northwest region.

Clinton Haight and Fred Young, Baker prospectors, have staked claims in northeastern Oregon's Wallowa Mountains, near where Los Angeles Mayor Norris Poulson and associates previously filed on 20 uranium claims.

The *Horse Heaven* quicksilver mine in Jefferson County, Oregon is expected to start producing soon with the reported installation of a small furnace on the property by *Cordero Mining Company*. The property shut down in 1944 following a fire which burned the furnace plant. Ore which had been broken at that time will now be treated first in the new furnace.

Powder River Dredging Company is reported to have suspended dredging operations in Sumpter Valley because of inability to secure some additional ground. This was the only active gold dredge in the state, and will reduce Oregon's gold production considerably.

WASHINGTON

Ruby Silver Mines, Inc. organized a year ago to take over the long-idle 18-claim *Garrett* property near Nespelem, Okanogan County, Washington has installed a 50-70-ton flotation mill and made an initial smelter shipment. Exploration and development work are scheduled this winter, with ore to be stockpiled for resumption of milling op-

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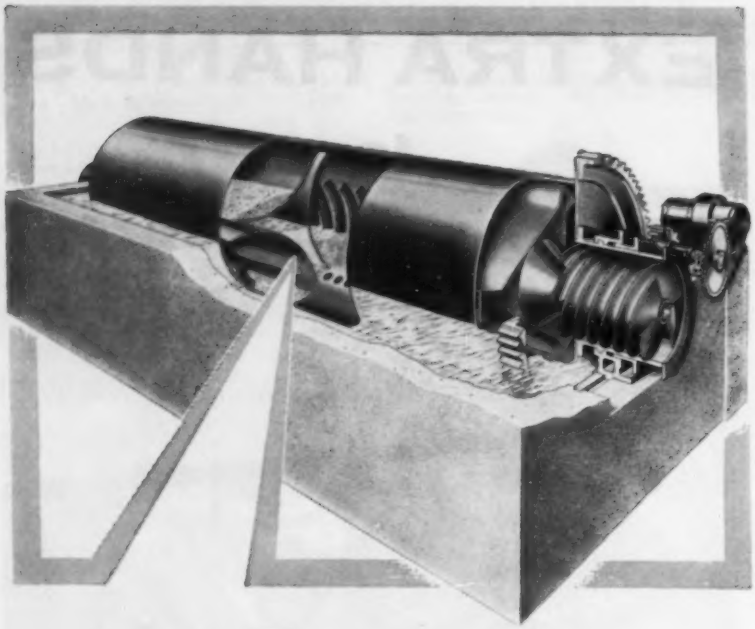

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erations in the spring. Five men were employed at last report. H. O. Dhont of Elmer City, is president; A. G. Henderson, Washington, D.C., secretary-treasurer; J. R. Bartlett, mine manager.

Talisman Mining and Leasing Company of Spokane, Washington is planning to explore 20 claims acquired in Utah and Colorado uranium country. It also is negotiating for additional claims. Joseph Skorupski, Spokane, is president.

United Development Company at Spokane, Washington organized specifically to drill for oil in Pacific County, Washington is looking into the possibility of acquiring uranium claims on the Colorado plateau. Joseph Skorupski, Spokane, is president.

The Northwest Mining Association, with headquarters in Spokane, Washington has protested a Forest Service application to withdraw some 31,000 acres in Washington State from entry under the public land laws. The mining group also has demanded a public hearing. Most of the acreage lies along scenic highways. The forest service says that 4,300 acres are needed for public camp grounds in five national forests.

The School of Mineral Engineering of the University of Washington at Seattle is offering a Prospectors Course during the winter quarter from January 3 to March 17. The course will also be repeated during the autumn and spring quarters of each year.

International Mining and Machinery Company, Inc. has been incorporated by Marquis L. Greenewalt, C. H. Woodward and M. J. Knott, all of Spokane, Washington. Capitalization is $50,000.

Julian C. Rice, D. N. Morrison and Gordon E. Lake, all of Spokane, have organized *Gustav Exploration Company* to explore for oil and minerals. Capitalization is $50,000.

I. R. Jones, Wenatchee, has filed on some uranium claims in the Trinidad area of Grant County, Washington. They were the first filings for uranium in the county.

Chewelah Copper Company has signed a $63,000 exploration contract with the Defense Minerals Exploration Administration and taken a purchase option on the 200-ton *Bonanza* concentrator near Colville, Washington. The firm also has purchased air compressors, mine cars, a locomotive, and other mining equipment from Earle B. Gibbs of Colville, owner of the *Bonanza* mine and mill, who is retiring because of ill health. Plans call for trucking ore to the mill from the old *United Copper, Amazon, Copper King, Copper Queen, Independence-Keystone,* and *Dickey-Hughes* mines on Eagle Mountain near Chewelah, Stevens County. Old workings reopened by the firm have disclosed substantial tonnages left by early-day operators. Values are in copper and silver. The 50 percent DMEA loan provides for 2,100 feet of diamond drilling and 1,400 feet of drifting and crosscutting to explore the Keystone vein in the footwall of the *United Copper* mine. Frank H. Mitchell, Spokane mining engineer, is in charge of operations.

A new mining and equipment firm has been organized in Spokane, Washington. It is incorporated as *Hedges-Benson, Inc.*, with capital of $5000. Incorporators were Bill M. Hedges, Everett Benson and William E. Hennessey.

Anaconda Resumes Limited Program at Darwin Mine

A limited development work program has been started at the Darwin mine of Anaconda Copper Mining Company at Darwin, California. Two development headings are being driven. One is a permanent ventilation project, and the other a downward continuation of an incline shaft to supplement the hoisting of ore and waste in a vertical shaft from lower levels during periods of ore production and development.

The mine has been closed since February 1954, when the market price of lead and zinc made continuation of operations unprofitable. There has been no announcement yet about resumption of full-scale operations.

Bisbee, Arizona Firm To Mill Manganese Ore

The Arizona Materials Service Company has purchased the old Shattuck-Denn mill in Bisbee, Arizona, and will begin milling of manganese ore shortly. The Air-Tex Company will be the mill operator.

Ore will come from the open-pit mines six miles south of Tombstone where about 100,000 tons of manganese ore is reported to have been exposed with equipment on hand. Another $400,000 worth of mining machinery is en route to the mine site.

The mill process will include the sink-float system and then flotation through 65-mesh equipment. Throughput is expected to be at the rate of 500 tons per day. The concentrate will be shipped to the government's stockpile at Deming, New Mexico.

In addition to this project, Arizona Materials Service also holds leases on 1,000 acres in Cochise County where the firm plans to conduct extensive core drilling explorations.

Ray E. Craig is general manager of the Bisbee operation.

AEC Requests Lease For Arizona Tribal Land

The San Carlos Apache Tribal Council is considering a request of the United States Atomic Energy Commission to lease reservation land for establishment of a uranium ore-buying station and mill eight miles east of Globe, Arizona. The American Smelting and Refiining Company would act as the AEC agent in operating the station and mill. There has been quite a uranium rush in this area of Gila County with hundreds of claims staked, and a few important discoveries made.

New Idria Joins Verdi In Uranium Venture

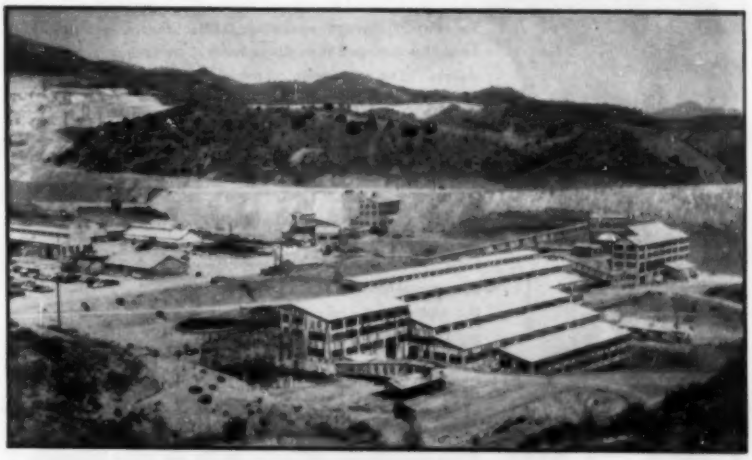
The New Idria Mining and Chemical Company, large California quicksilver producer, recently acquired 200,000 shares of stock in the Verdi Development Company which has uranium holdings in the Rosamond area of the Mojave Desert, Kern County, California. New Idria has also entered into a consulting contract with Verdi to put the latter's properties into production in the earliest possible time. Verdi recently acquired six additional uranium leases in the Rosamond field bringing the company's holdings in the area to 2,200 acres.

Charles F. Parker, Jr., president of New Idria, and David Van Alstyne, Jr., partner in the New York investment firm of Van Alstyne, Noel & Co., have joined Verdi's board of directors. Tom Hedlund, formerly with Telluride Mines, Inc. of Telluride, Colorado has been made general manager of field operations for Verdi. He is directing the mining and exploration work on the Rosamond properties at the present time.

The *Tejon* mine and five near-by claims have been purchased by *Shannon Mining Company*, a wholly owned subsidiary of *Illinois Zinc Company*. The Tejon is a lead-zinc-copper mine consisting of eight patented claims in the Turquoise mining district of Cochise County near Gleeson, Arizona. The Tejon is being operated by a lessee whose lease runs until 1958, and Shannon Mining Company, effective immediately, will receive all rents, royalties, and payments under that lease.

Development of a copper property is being started by *Pinal Copper and Uranium Corporation*, a new company incorporated in Arizona in October with an authorized capital of $30,000,000. According to Edward Hopkins, president, the property consists of 54 claims on the Papago Indian Reservation 48 miles southwest of Casa Grande. Five of the claims were the western fringe claims of the old *Greenback* mine operated a number of years ago by the *Greenback Mining Company*, Paul Hinshaw, manager. The balance of the holdings are all new territory. So far five drill holes have been drilled for an average depth of 145 feet. All were reported in ore and one drilled to 285 feet was said to show high-grade copper. Additional testing is in progress with two drills and two drill crews of four men each. Other officers of the company are: John P. Wilson, Jr., of the Chicago law firm of Wilson and McIlvaine, first vice-president; Harold Ferrin, engineer of Phoenix and Tucson, second vice-president; Conrad Kleinman, of the Phoenix law firm of Rawlins, Davis, Christy, Kleinman and Burrus, secretary. The board of directors is made up of the officers plus Paul Hinshaw from whom the five Greenback claims were purchased. P. H. Lund of Phoenix is consulting engineer and geologist. Financing of the development is said to be underwritten in New York.

A. L. Poarch of Prescott, Arizona is constructing a reduction plant to treat existing tailings as well as the daily run from the Iron King mill. The treatment will be for the recovery of sulphur and iron, together with the precious metals contained in the tailings. The present unit will serve as a pilot or experimental plant to thoroughly develop the process to be used, and plans call for enlarging the capacity to 1,000 tons daily. The location of the plant is on the site of the old Humboldt Smelter. Funds for the project, it is said, are provided by a private syndicate which plans to incorporate at a later date. A crew of 15 to 20 men is employed.



Copper Cities Concentrator in Full Operation

The last two sections of the new seven-section, 12,000-ton-per-day copper mill of Copper Cities Mining Company went into operation at Miami, Arizona on November 1, 1954. Miami Copper Company is the parent organization of this huge new project which may be seen in the photograph above. Shown in the center background, just below the road level, is the primary crusher building. The crushed ore is conveyed to the adjacent structure which houses Symons Standard crushers, and then to the building at the right where Symons shorthead crushers are located. The upper level of the mill building (large building in the center) contains a 15,000-ton fine ore bin which feeds the seven sections of the mill. Flotation concentrate is filtered in the housing erected next to the sub-station, and located by conveyor on truck trailers. Middling and concentrate thickeners are shown just behind the sub-station and filter building. Across the road in the upper left-hand corner, a part of the open-pit mine is visible. See MINING WORLD, May 1954, pages 34-38, for complete story on Miami Copper's move from Castle Dome to Copper Cities.

Minerals Purchases Through 30 September 1954 Under Government Purchase Plan For Domestic Minerals and Total Authorized Purchases

Mineral	*Through 30 June, 1954*	*Through 30 September 1954*	*Total Authorized*
Beryl[1]	266	457	1,500
Chrome ore[1] and concentrate	64,282	70,040	200,000
Columbium-Tantalum[2,3]	4,666,271	5,326,114	15,000,000
Manganese[4]			
Butte-Phillipsburg	832,500	1,109,640	6,000,000
Deming	1,368,000	1,713,881	6,000,000
Weeden	4,210,600	4,909,479	6,000,000
Carload	1,350,900	1,679,988	19,000,000
Mica[1,5]	3,413		
Tungsten Trioxide[6]	985,295	1,224,367	3,000,000
Mercury[7]	None	None	125,000

1. Short tons.
2. Foreign and domestic.
3. Pounds.
4. Long dry ton units.
5. Hand cobbed or equivalent.
6. Short ton units.
7. Flasks.

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CALIFORNIA

The *J. R. Simplot Company* of Boise, Idaho recently carried out a very preliminary examination of tungsten properties in the Pine Creek-Mt. Tom area near Bishop, California. The firm reports that nothing definite has been decided yet.

At Desert Center near Blythe, California contract crews are reported to be evaluating an iron-bearing ore deposit located beneath 1,000 feet of overburden. *Gene Reid Drilling, Inc.* is operating a 4,500-foot rig for the *Columbia-Geneva Division* of the *United States Steel Corporation*, after smaller core hole equipment was found to be too slow. *Kaiser Steel Company* is exploring in the same area, which is just east of Kaiser's *Eagle Mountain* iron mine. U.S. Steel is attempting to prevent Kaiser's continuation because it says the claims belong to U.S. Steel. Kaiser says the area is vacant public land open for mineral location and the matter is now part of a spirited lawsuit.

The *Ajax Tungsten Corporation's* new crushing and screening plant has gone into operation at Darwin, California. The new plant will be able to handle 50 tons of ore per hour. The crushed and screened material is then hauled to the former Benware mill under lease by Ajax from the *Molybdenum Corporation of America*. Ajax has a 10-year lease on the *Hanging Valley* and *Tungstar* mines near Bishop which, with the Darwin division, will supply the ore for the new plant.

NEVADA

The *Nevada Ore Refining Corporation* has placed its new manganese mill in operation near Reno, Nevada. The plant is designed to produce highgrade chemicals from ore not acceptable for government stockpile. With a capacity of 50 tons a day, the company plans eventually to produce all grades of manganese. Dr. J. Franklin Schrum is chief engineer and technical director of the company.

The *Kings River Uranium Corporation* of Reno, Nevada has leased a large portion of its uranium holdings to the *American Northland Oil Company*. The lease calls for a one-year option on 340 acres of ground, during which time the lessees will explore by means of diamond drilling, shafts, and tunnel work. The property is located about 75 miles north of Winnemucca, in the Kings River Valley. Kings River Uranium was formed last July, with H. C. Skeels as president. The company is operating a fluorspar property itself in Pershing County, Nevada. Considerable ore has been blocked out and open pitting is to start shortly.

A. J. O'Connor, vice president and general manager of *Consolidated Coppermines Corporation*, has announced that a "Consolidated Coppermines Foundation Scholarship," in the amount of $500 annually, will be awarded to a student graduating from the White Pine County High School (Nevada) who has had a good scholastic record and shows

qualities of leadership. Financial need will also be considered in making the award. The recipient may enroll in a course of his own choosing and at a school of his own choosing. Nick Reyes was the first recipient of this scholarship and is now enrolled at the University of Nevada, in the School of Engineering. Consolidated Coppermines operates copper properties in White Pine County, Nevada, and is one of the important copper producers of the state.

Minerals Engineering Company of Grand Junction, Colorado has leased the tungsten mill of *Baltimore-Camas Mines, Inc.* at Ely, Nevada. The mill was shutdown for a short time to make some changes in the flowsheet. Concentrates from this 150-ton-per-day mill will be trucked to the *Salt Lake Tungsten Company's* refinery at Salt Lake City, Utah, in which Mineral Engineering has an interest. The mill will treat ore from the *Monte Cristo* tungsten mine which has been leased-in-bond from the Murphy brothers. The mill will also accept custom shipments, and will buy ore as low as 0.40 percent WO_3. Ninety percent recoveries are expected at the mill.

A high-grade tungsten mine is reported to be in production in Churchill County, Nevada. *Tungsten Mountain Mining Company* has been organized to operate the property. About 17,500 tons of ore have been mined from an 80-foot length of tunnel and an open 35-by-16-foot stope. About 533 tons of ore have been shipped to the *United States Vanadium Company's* mill at Bishop, California, while the remainder is being stockpiled for eventual milling at the property. Arthur Lakes is in charge of the new firm. B. W. Porter of Seattle is one of the principals in the firm's organization.

The *Wah Chang Mining Corporation* has been steadily increasing the production of tungsten ore from its *Lincoln* mine at Tempiute, Nevada. Average daily mine production is now 700 tons. The mining method has been changed from using shrinkage stopes with chutes to draw points and mucking machines. This change was necessitated because of the blocky ore plugging up the chutes. Since the last MINING WORLD news was published on the Lincoln mine, there has been a change in personnel. J. C. Perkins, who was general superintendent, has resigned. His former position is being temporarily handled by E. G. Woods, who is acting as general superintendent.

Consolidated Eureka Mining Company at Eureka, Nevada has reached the limits of the lead-zinc-silver ore body located in crosscutting operations, and has now started a raise to explore for the upper limits. Work will soon start to determine the trend of the ore body going down below the level. To facilitate shipping of this ore, a new ore bin is being erected and some road work is being done. To speed up mining, additional equipment is being purchased.

NEW MEXICO

The *National Farmers Union* and *Kerr-McGee Oil Industries* will jointly develop approximately 13,000 acres of potash land in southeast New Mexico near Artesia. The area is leased to National Farmers Union which has spent about $750,000 in exploring the potash beds over the last five years. A mine shaft will be sunk to reach the beds which are 1,400 feet below the surface. A pilot operation will be set up at the Colorado School of Mines, and a new company will be formed by the two firms to do actual mining, processing, and distributing of the potash.

Petaca Mining Corporation has started construction of its $300,000 mica mill near Santa Fe, New Mexico. *Southwestern Engineering Company* of Los Angeles is actually doing the work for Petaca. The mill will process 300 tons of mica ore per day and will produce 60 to 75 tons of mica concentrate when in full production later this year. Petaca has 22 mining claims covering 440 acres in New Mexico and a 50 percent interest in 77 uranium claims on the Colorado plateau. Petaca is operated by the Brothers of Christian Schools.

The Acoma and Zuni Indian Tribal Councils have approved two bids for uranium rights on their reservations. The Acoma tribe has accepted an offer of $101,110 from the *Sapphire American Petroleum Company, Inc.* of New York for a permit to prospect 160,500 acres of land, most of it south of Highway 66. The Zuni tribe has accepted a bid of $10,000 from the *Holly Uranium Corporation* of New York. Both bids guaranteed that Indian labor would be used where possible.

The *New Mexico Copper Corporation* has completed its 50-ton-per-day mill at Carrizozo, New Mexico and it is now in operation. The flotation mill is treating lead, silver, copper, and fluorspar ore from the *Conqueror Rio Tinto* and *Surprise Park Gold* mines. A special table section has been added to concentrate rare earth oxides. The company plans to increase mill capacity to 150 tons of ore daily. C. E. Degner is president and general manager.

Freeport Sulphur Company of New York and *Pittsburgh Consolidation Coal Company* of Pittsburgh are reported to be negotiating for a joint potash operation near Carlsbad, New Mexico. If a contract is signed, a $15,000,000 potash mine and refinery will be constructed east of Carlsbad.

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Colorado Mine Association To Meet in Denver Feb. 3-5

The National Western Mining Convention, sponsored by the Colorado Mining Association, will be held in Denver, Colorado, February 3, 4, and 5. Under the chairmanship of Frank Coolbaugh, Climax Molybdenum Company, the program will feature sessions on uranium, lead-zinc, tungsten, manganese, gold, oil shale, fluorspar, and other non-metallics.

Speakers and guests will include representatives of the new United States Congressional Committees, as well as outstanding leaders in the mining industry.

This list includes D. L. Collins, technical director, Victoreen Instrument Company; Lucien Cullen; Ralph H. Demmler, chairman of the Securities and Exchange Commission, Washington, D. C.; Armand G. Erpf, Carl M. Loeb, Rhoades & Company, New York City; Eugene B. Hotchkiss, vice president, Vitro Corporation of America; Vincent Kelley, director, University of New Mexico department of geology; Walter E. Kingston, general maanger, Atomic Energy Division, Sylvania Electric Products, Inc.; John W. Landis, Atomic Energy Division, Babcock & Wilcox Company; John R. Menke, president, Nuclear Development Associates, Inc.; L. L. Steindler, Norbute Corporation.

Helping Mr. Coolbaugh with the convention program are Vernon J. Pick, Pick Uranium Company, and Clyde V. Johnson, Denver Equipment Company. Also heading convention committees are M. K. Ruddock, Cal Uranium Company, who is handling the traditional Sow Belly Dinner; D. E. Hoffman, Hunt Oil Company, and B. C. Essig, Gardner-Denver Company, who are in charge of the Uranium-Gold-Silver Banquet.

Coincident with the convention will be the release of a television movie covering all phases of the uranium industry on the Plateau. Showing scenes in and about Moab, Utah, the Big Indian area, Monticello, and various parts of Colorado, the program was filmed under the supervision of Carl Peterson, radio-television chairman for the Colorado Mining Association, with technical advice from executive director Robert S. Palmer.

Colorado Firm Concludes $1,250,000 Uranium Deal

Flanders Mining Company, Grand Junction, Colorado has purchased the entire assets of the Gateway Mining & Development Company, including 150 claims on Beaver Mesa, about eight miles west of Gateway, Colorado. Price of the sale was $1,250,000. Limited explorations on the uranium properties by the United States Geological Survey and Gateway Mining have outlined two ore bodies described as sizable. A full AEC production bonus of $35,000 has already been paid on one mine.

Flanders has sold approximately 20 of the claims located on the northwestern edge of the property to the Gateway Uranium Corporation of Salt Lake City, Utah. Included in these claims is the Thornton ore body, already partially blocked out and known to be of considerable size. Flanders has also sold a one-half interest in 100 of the claims to the Southwestern Uranium Trading Corporation.

Senior partner in the firm is Frederick L. Anderson, Atherton, California. Two general partners are H. P. Slagel, Fruita, Colorado, and Lee Van Atta, Dallas, Texas. The company has opened an office in Grand Junction.

AEC, VCA Sign Contract To Expand Naturita Mill

A contract to increase the capacity of the Vanadium Corporation of America plant at Naturita, Colorado was signed by the VCA and the U.S. Atomic Energy Commission. The additional facilities, which were necessitated by increasing supplies of uranium-bearing ores, are expected to be in operation by early this year.

The Naturita plant expansion is the seventh such program in the past eight months. Other additions have included those at Grants, New Mexico, Anaconda Copper Mining Company; Salt Lake City, Utah, Vitro Uranium Corporation; Durango, Colorado, Vanadium Corporation of America; Grand Junction, Colorado, Climax Uranium Company; Monticello, Utah, government-owned plant.

Construction of new additions at the Monticello mill will begin early this year. Galigher Company, operator of the mill, is handling the engineering design, plans, specifications, and cost estimates, and the H. K. Ferguson Company of Cleveland, Ohio will do the actual construction work. This program is expected to be completed this year.

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COLORADO

Construction of a new crushing and sampling plant at the *Climax Uranium Company* mill in Grand Junction, Colorado is now underway. The expansion work is being done by *Western-Knapp Engineering Company* of San Francisco, California. *Associated Engineers, Inc.* of Denver has completed designs for construction of a new slime leach building and for increasing the height of the plant's roaster building. Bids for this job will soon be called for by Climax.

Crown Uranium Company, Casper, Wyoming, reports shipment of 60 tons of uranium ore from its five *Lost Brothers* claims in San Miguel County, Colorado. The ore averaged 0.3 percent U_3O_8. The mine is located 20 miles from Nucla in Ham Canyon. Crown Uranium plans to develop 36 more claims on the Colorado Plateau and is negotiating for 5,000 acres in Wyoming's Fremont County. Awaiting approval of the firm's board of directors is a stock exchange with *New York Investors Mutual, Inc.* which would make available to Crown the resources of *Mutuals Corporation* and an additional $175,000 for future expansion. The investment firm is currently

purchasing additional properties which will be added to Crown's holdings.

Climax Uranium Company has contracted with Richard O. Dulaney, Jr. and the F. Kirk Johnson interests of Fort Worth, Texas to conduct an exploratory drilling and development program on several of Climax's properties in return for a working interest. Properties farmed out by Climax under the contract are located on Long Park, Polar Mesa, and Beaver Mesa, all in the Uravan Mineral Belt. Other blocks of ground are in the White Canyon and San Rafael swell areas of Utah. Dulaney and Johnson expect to have 25 drilling units in operation on the Colorado Plateau in the near future. Up to $500,000 is expected to be spent by the groups in the development of the Climax and other properties.

More than 2,000 mining claims were filed November 12 at the office of the Montrose, Colorado county clerk as a result of the United States Department of the Interior restoring 18,480 acres of public lands and 2,280 acres of patented lands for location. Located in the county's Uravan mining district the lands reopened for location were part of the 55,222.94 acres withdrawn for use by the United States Atomic Energy Commission in February 1951.

Operations at the *Minerals Mining & Milling Company* mill in Rico, Colorado started early in November. The mill is now operating on two shifts with another planned for the near future. The lead-silver ore being milled comes from the *Union Carbonate* mine which the Rico firm has under lease. Ken Erickson is manager and mill superintendent. Eddie Baer is mine superintendent.

Edwin Arbar, Jr., a student at Western State College in Gunnison, Colorado, has discovered a vein of reportedly high-grade uranium ore in the Holy Cross Mining district, 21 miles from Red Cliff. Mineral composition was identified as autunite and assays showed 0.734 to 2.105 percent U_3O_8. Mr. Arbar, who has 22 claims in a block formation in the area, expects to start shipping ore next summer.

Climax Molybdenum Company engineers believed they have succeeded in caving a portion of the 940 area above the *Phillipson* tunnel. The firm has successfully been using the panel block caving method but in this instance it was necessary to detonate a large charge of powder from above the overburden which refused to cave when supporting pillars were removed. Nine holes were drilled in the area from 85 to 100 feet deep with seven of the holes cased. Between four and five tons of explosives were loaded into the holes with an additional 30 tons placed in a surface breakthrough to the old Leal level. Mine superintendent John Petty says that although only time will tell whether a sufficient quantity of ore has caved, it appears that the blast has created good draw of ore.

About 250 miners and millmen will be employed by late 1955 at the Telluride, Colorado operations of *Telluride Mines, Inc.* The company recently announced re-opening of the mine after a year-long shutdown caused by low base metal prices. Enlarging of the mill is being done by *Idarado Mining Company* which owns Telluride Mines. A new flowsheet which was originally developed for *Newmont Mining Company's* Tsumeb lead-copper-zinc property in Southwest Africa is planned. Concentrates from the Telluride mill will be purchased by the *American Smelting and Refining Company*. Telluride has also announced that it has a mine crew at work gunniting the Mill Level Tunnel at its *Smuggler* mine at Pandora, Colorado.

Amex Uranium Company, subsidiary of *Hamil Silver-Lead Mines, Ltd.*, British Columbia, has drifted more than 150 feet on a uranium-bearing zone at the *Aileen* lease, Bow Knott, Green River area, Utah. The zone was discovered by diamond drilling and was reached by a crosscut.

Idaho-Maryland Corporation, Grass Valley, California, has started active development work on its Utah uranium leases near Moab. The work is under the supervision of Richard Teichman, mining engineer, and Bert C. Austin, president and manager of the firm.

The *Cal-Uranium Company* is taking uranium ore from its *San Juan* Shaft in Big Indian Valley near Moab, Utah. The San Juan is one of the first completed shafts on Utah uranium properties. It is 280 feet deep and the operators are using Bethlehem ⅝-inch non-rotating wire rope, furnished through *Cate Equipment Company*, Moab, on its shaft hoist drum. The San Juan shaft was sunk after the completion of Charlie Steen's Discovery shaft which started the uranium rush in the Big Indian District.

U&I Uranium, Inc., Kellogg, Idaho, has completed one phase of its core drilling program on the *Radon* group of uranium claims in the Moab, Utah area. An orebody 2,400 feet long, 400 feet wide, and averaging 700 feet below the surface was defined, and operating plans are being formulated. Preparations are also being made to resume core drilling on a second group of claims adjoining the Radon group.

Homestake Mining Company, South Dakota gold producer which has recently entered the Colorado Plateau uranium field, completed a drilling program on the *Alice* lease in the Big Indian District, San Juan County, Utah. At another of Homestake's uranium properties, the *La Sal* lease which is three miles from the Alice, cross-cutting is underway but no ore has been shipped yet. The three-compartment shaft at the La Sal lease was completed in November and production is expected during the first part of this year. Homestake is also drifting on ore at the *Little Beaver* lease 3½ miles from the La Sal property.

United Park City Mines Company, which resumed its operations in Summit County, Utah late last year after a 2½-year shutdown, has made a high-grade lead-silver discovery in drifting along the Crescent Fissure on the 2,100-foot level in the Daly-West section of its Park District property. Initial assays showed

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Arundel Mining Company, Marysvale, Utah, shipped a 75-ton carload of gold-silver-copper-lead-zinc ore from its lease six miles south of Marysvale.

Cerro de Pasco Corporation, one of the world's largest copper producers, has acquired option on 52 uranium claims from Art Chaffin, Hite, Utah. The claims are 14 miles south of Hite on the east side of the Colorado River.

American Smelting & Refining Company has asked the Utah State Board of Corrections for permission to conduct exploratory drilling on the State Prison grounds for the purpose of evaluating anomalies indicated by magnetometer surveys. The State Land Board already has approved a company request for mineral rights on the property but stipulated that a satisfactory working agreement must be reached with prison officials. (See MINING WORLD, August 1954, page 80.)

The Natomas Company, California gold mining firm, is conducting exploratory work on 6,000 acres in Elk Ridge, near Moab, Utah. The property is comprised of 290 claims which were purchased by the company from *Wooden Brothers* and *Webster Brothers* for $50,000 plus a 7½ percent royalty. The company also holds option on 33 claims of *Keither Barker and Associates*, Moab.

I. H. Carter and associates have begun test drillings for uranium near Cedar City in southern Utah. Tests have been conducted on 31 claims called the *Cedar Breaks Claims*, approximately one mile south of Iron Mountain west of Cedar City. By the end of October drilling had reached 160 feet. Ore production is expected to begin in the near future.

An addition to the United States Atomic Energy Commission's uranium ore processing mill at Monticello, Utah is being planned. The *H. K. Ferguson Company* of Cleveland, Ohio has been tentatively selected to do the job. Terms of the contract are still to be worked out, although cost of the job has been estimated at more than $1,000,000. The new mill is being designed by the *Galigher Company* of Salt Lake City, Utah, operator of the present Monticello mill. The plant is being expanded to treat uranium ores by an acid bleaching process. It now has a soda ash circuit which is used for normal carnotite ores.

Establishment of an ore department within the *Vitro Uranium Company*, a division of *Vitro Corporation of America*, has been announced in Salt Lake City, Utah. The department is headed by Jack O. Horton, Sheridan, Wyoming, geologist. The department will seek uranium mining prospects and reportedly will enter into actual mining operations where profitable conditions so warrant.

WYOMING

Intensive drilling is reportedly being carried on by *Vitro Uranium Company*, subsidiary of *Vitro Corporation of America*, at its *Gunnell* claims in Fremont County, Wyoming. The claims were purchased from the *Sateco Uranium Company* (see MINING WORLD, November 1954, page 85).

Carrol P. Payne and Cotter Ferguson, Laramie, Wyoming are planning to begin drilling work on eight Gas Hills uranium claims purchased recently from three Lander residents. Approximately $12,000 was paid for the claims, which reportedly contain promising radioactive material. The Laramie men purchased the property under an option arrangement, and after preliminary exploratory work bought the claims.

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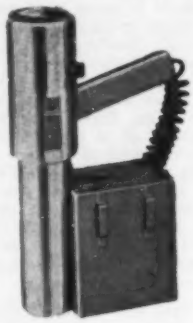

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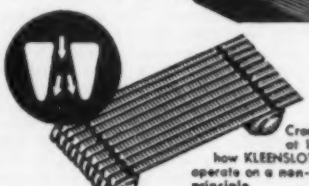

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The substantive salary attached to the post will be as arranged between the successful applicant and the University, but will not be less than £3,000 per annum. In addition, a married man will receive cost of living allowance at such rate as may be authorized from time to time, the present rate being £234 per annum.

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The pensionable salary is at present £1,600 per annum. Membership of the University's Staff Medical Aid Fund is also compulsory in the case of an officer who is eligible for such membership, and contribution will be in accordance with the rules of the Fund.

The Professor will be called upon as part of his duties to serve as a Consultant to the Transvaal and Orange Free State Chamber of Mines. He will not, except under special circumstances, be granted permission to engage in private consultative work.

Duties are to be assumed on the 1st July, 1955, or as soon as possible thereafter. Applicants are advised to obtain the information sheet giving more details in regard to this vacancy from the Registrar, University, Milnar Park, Johannesburg, South Africa, with whom Applications should be lodged not later than 31st January, 1955.

WANTED: Owners of copper mine having high values in gold and silver offer third interest to person who will provide as a loan $5,000 for working capital. Loan to be refunded by applying substantial percentage of smelter returns on ore shipments which can begin in ninety days. Complete information to person interested. Ramon Calleros, Maestranza #71, Guadalajara, Jalisco, Mexico

FOR SALE OR LEASE: Chrome mine 525 acres paved country road. Water, electric phone, mill site. Mine ready for production. Assays chromic oxide 52.25-44%. Low grade 25%. Chrome iron ratios 2.51:1, 2.89:1. 2 hours dozer work to chrome. Robert B. Reeve, Chiles Star Route, St. Helena, California

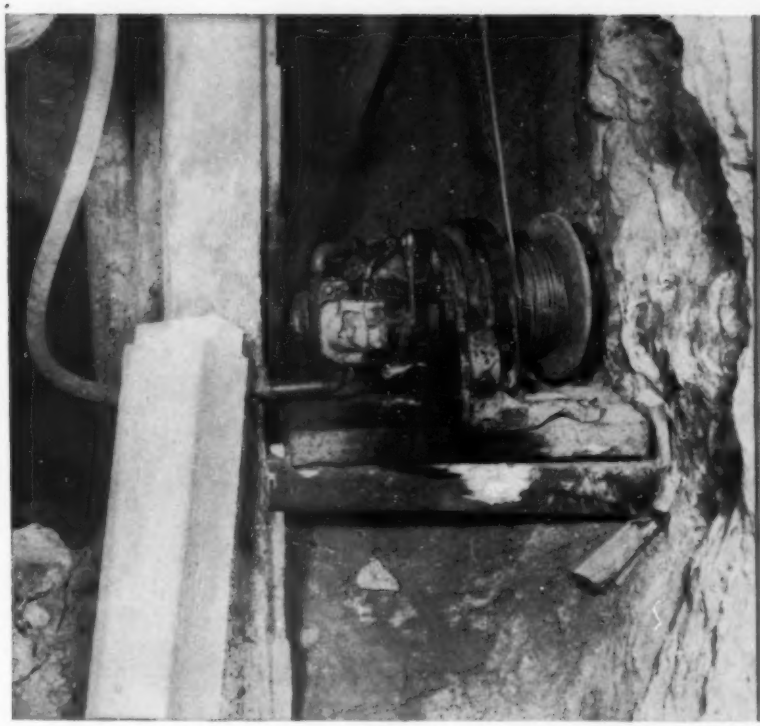
FOR SALE: Four Linn halftracks, Model HALO, 8 yard rear dump bodies, enclosed cabs, 165 hp Hercules HXE gasoline engines, Fuller transmissions, with Fuller reversing transmissions. Zonolite Company, Libby, Montana.

FOR SALE: Pneumatic tired 5th wheel steer Williams double drum hoist and drag line with "A" frame, slusher and two ball bearing snatch blocks. Weighs 3800, has starter and lites and four cylinder motor. Everything in good shape. Photo on request. $600 cash. Thayer Harp, Box #11, Daggett, California. Phone 6461.

Formerly producing quicksilver mine needs financing for further development, or would sell. Good chance for quick production. Full particulars from Ernie Howard, MintoMines P. O., British Columbia, Canada.

WANTED—MINE MECHANICAL SUPERVISOR: For long established American Company in Mediterranean. Excellent living conditions and climate. Furnished housing provided. Must be competent supervisor in general mine mechanical work, blacksmithing, welding, upkeep of metal mining equipment such as air drills, steel treatment and sharpening, car loaders, haulage, hoisting, slushers, fans, pumps, diesel and storage battery locomotive tramming, diesel compressors, surface and underground electrical installations, saw mill, etc. Three-year contract. Schools to 14 years. Medical service. Must report single status for six months, salary open. Require with first reply complete record education, experience, references, photograph (optional), age, marital status. Reply Box A-3, Mining World, 121 Second Street, San Francisco 5, California.

TUNGSTEN-GOLD PROPERTY for sale or lease by owner. Extremely mineralized section, five veins, 400 foot vertical shaft (needs retimbering). Easy terms, H. G. Graves, Box 25, Redding, California.



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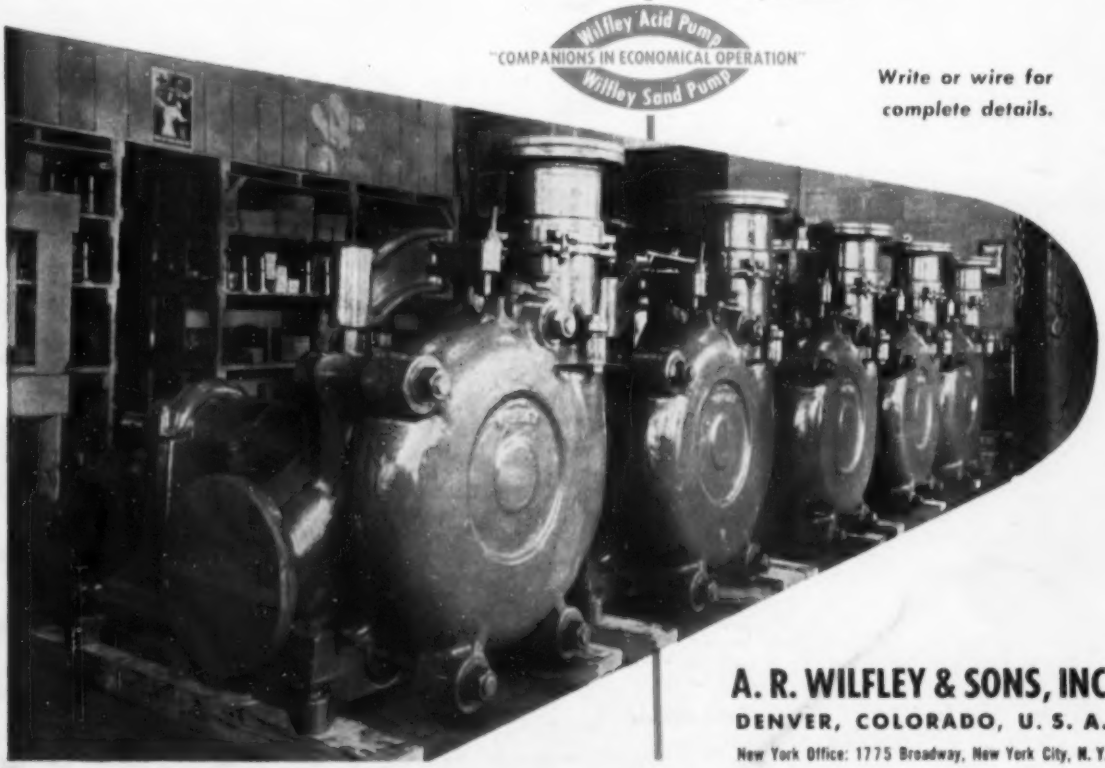

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